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ROYAL SOCIETY of SOUTH AUSTRALIA.

VOL. XII.

For 1888-89.

EDITED BY PROF. R. TATE, F.G.S., F.L.S.

[With Five Plates.]

PRICE FIVE SHILLINGS.

Adelaide:

W. C. RIGBY, 74, KING WILLIAM STREET.

DECEMBER, 1889.

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The Foraminifera of the Older Tertiary of Australia (No. 1, Muddy Creek, Victoria).

By Walter Howchin, F.G.S.

[Read October 4, 1888.]

Plate I.

The Older Tertiary beds exposed on Muddy Creek consist of two main divisions, sharply distinguished in their palæontological as well as their stratigraphical features.* In the following list those species which only occur in the Lower Bed are indicated by an asterisk (*). Those peculiar to the Upper Bed are marked with a dagger (†).

FAMILY MILIOLIDÆ.

Genus—Biloculina, *d'Orbigny.*

1. *B. ringens*, Lamk. Not common in Lower Bed, but include some very large examples. Upper Bed, rather scarce.

2. *B. depresa*, d'Orb. Most of the specimens possess flaps at the aboral extremity, as shown by Mr. Brady in "Challenger" Report, but those from Muddy Creek have these appendages much larger than the one figured by Mr. Brady. Lower Bed, rather scarce, as also in Upper Bed.

3. **B. irregularis*, d'Orb. These exhibit great diversity of form, some being much depressed laterally, whilst others in their subglobular outline approach very near to *B. sphaera*. The aperture is generally a curved gaping slit without tongue. Lower Bed, rather scarce.

4. *B. elongata*, d'Orb. Lower Bed and Upper Bed, rare.

5. †*B. bulloides*, d'Orb. The examples of this species are few in number, but of large size, and are distinguished by very large stelate apertures. Mr. Brady ("Challenger" Report) has shown that *B. sphaera*, d'Orb., sometimes possesses a labyrinthic aperture, especially in the case of deep water examples. In the present instance the aperture is not labyrinthic, but exhibits strong bars of shell substance radiating from the centre to the outer margin of the oral aperture. Upper Bed, rare.

6. †*B. sp.* A large species of *Biloculina*, possessing thick longitudinal costæ which are rendered still more conspicuous by a slight weathering of the test, was obtained from the Upper Bed;

* Dennant, Roy. Soc. S. Aust., vol. xi., p. 30, et seq.; Tate, Roy. Soc., N.S.W., 1888, p. 242.

but the specimens, which were few in number, have been unfortunately mislaid.

Genus—Miliolina, *Williamson.*

7. *M. seminulum*, Linn. Of the short and thick variety, mostly fine examples, measuring up to one-tenth of an inch. Lower Bed, moderately common. Upper Bed, very common.

8. **M. Cuvieriana*, d'Orb. Lower Bed, rather scarce.

9. *M. trigonula*, Lamk. In Lower and Upper Beds, rather scarce.

10. *M. tricarinata*, d'Orb. Lower Bed, rather scarce. Upper Bed, rare.

11. **M. valvularis*, Rss. A single example of robust build has, with some hesitation, been referred to this species. Lower Bed.

12. **M. prisca*, Terq. One of the pitted *Miliolidæ*. In weathered specimens the pitted depressions become coarse perforations of the test. Lower Bed, moderately common.

13. *M. oblonga*, Montag. Not very characteristic, the specimens being mainly passage forms approaching the elongated varieties of *M. seminulum*. Lower Bed, moderately common. Upper Bed, common.

14. **M. pygmæa*, Rss. Lower Bed, moderately common.

15. *M. Linneana*, d'Orb. Several examples of this fine species were observed in both formations, but it is not very common.

16. **M. Brongniartii*, d'Orb. Lower Bed, rare.

17. **M. Ferussacii*, d'Orb. Lower Bed, moderately common.

18. **M. undosa*, Kar. Many of the specimens show intermediate characters approaching *M. Ferussacii*. Lower Bed, common. The most characteristic examples of this species in the Challenger collection were from Bass Straits.

19. **M. scrobiculata*, Brady. One or two specimens were obtained in Lower Bed which agree very closely with Mr. Brady's descriptions and figures. This form must be distinguished from *Articulina sulcata*, which it somewhat resembles.

20. *M. agglutinans*, d'Orb. Specimens vary from a broad oval outline to a much elongated test with produced neck. Lower Bed, very common. In Upper Bed the examples are fewer in number, and for the most part very coarse in test structure.

21. **M. angularis*, sp. nov. Pl. i., figs. 1—3.

Test free, elongate, fusiform; composed of numerous (about 18 or 20) chambers, arranged lengthways, and more or less spirally around the longer axis. Segments narrow and much compressed, investing, only the final whorl being visible externally. Early chambers oval in transverse section; the later chambers increase in size mainly in a lateral direction. The final whorl consists of from five to six chambers arranged at obtuse angles to each other,

and exhibit in peripheral outline as many facets and angles as there are segments in outer whorl. External surface smooth. Aperture small, terminal, obscure. Length, $\frac{1}{18}$ in.

The species now described is distinguished from its congeners by the great number of its chambers, their shallowness in comparison with their length, and the completeness of their investing character. Its nearest analogue in the Milioline series appears to be *M. alveoliniformis*, Br. The latter species can be easily distinguished by its arenaceous test, tubular chambers, and deeply depressed sutures, whilst *M. angularis* is always porcellaneous in its testaceous investment, the chambers are compressed transversely to little more than narrow slits, and the sutures are flush or marked by prominent angles in peripheral outline. Lower Bed, moderately common.

22. †*M. secans*, d'Orb. Upper Bed, rather scarce.
23. †*M. bicornis*, W. and J. Upper Bed, very rare.
24. †*M. insignis*, Brady. Upper Bed, very rare.

Genus—Spiroloculina, *d'Orbigny*.

25. **S. asperula*, Kar. Rather coarsely arenaceous, with a thin outspread test. In the Muddy Creek specimens none but the marginal segments are distinctly visible on the exterior. Lower Bed, rare.
26. *S. grata*, Terq. Lower Bed, rather scarce. Upper Bed, very rare.
27. **S. affixa*, Terq. Lower Bed, rather scarce.
28. †*S. limbata*, d'Orb. Upper Bed, rather scarce.
29. **S. Tateana*, sp. nov. Pl. i., figs. 4, 5.

Test oblong or nearly circular, much compressed; primordial region biconvex and fusiform, consisting of numerous elongated segments arranged in an acervuline manner. Later chambers (varying from three to six on either side) flattened, outspread, and arranged concentrically. Segments narrow, smooth, nearly flush, much attenuated near the raised centre, increasing gradually in diameter towards the outer margin. Periphery rounded. Average size, $\frac{1}{40}$ in. diameter.

This shell is constructed on a double plan of growth, the earlier portions being Milioline, or investing, and the latter segments outspread or Spiroloculine. The acervuline chambers often exhibit a close resemblance to small examples of *Miliolina pygmæa*, and when the outspread portion of the test is reduced to a single segment on either side, as is the case with some specimens, the analogy is very close. The outer chambers form a fringe around the thickened centre very much like the alæ of certain seeds. It is a small and delicate shell, the outspread portion being sufficiently translucent to show by transmitted light

the septation with great distinctness. Mr. Brady, to whom specimens were submitted, informs me that he has occasionally met with examples similar to the present in recent material associated with *S. crenata*, Kar., and at the time regarded it as a weak thin-shelled modification of that species. *S. crenata* does not occur in the Muddy Creek material, but the form now described is comparatively common, and in no instance have I seen the slightest tendency to crenulation of the test as in *S. crenata*. There is therefore no alternative but to assign it a specific position. I have great pleasure in associating the name of my friend Prof. Ralph Tate, F.G.S., with this shell, as one who has devoted much time and conspicuous ability in working out the mollusca of the beds from which the species now described has been obtained. Lower Bed, moderately common.

Genus—Cornuspira, *Schultze*.

30. **C. involvens*, Rss. The larger examples exhibit an ornamentation of fine wavy disconnected striæ, running in a line with the convolutions. Lower Bed, rather scarce.

31. **C. foliacea*, Phil. It is worthy of note that all the specimens, which are more or less weathered, show a fine surface ornamentation resembling *C. striolata*, Brady ; but they undoubtedly belong to the above species, and the ornamentation seems to have been brought out as an effect of weathering. Lower Bed, rather scarce.

32. **C. crassisepta*, Brady. Lower Bed, rare.

Genus—Hauerina, *d'Orbigny*.

33. †*H. intermedia*, spec. nov. Pl. i., fig. 6.

Test free, compressed, consisting of two or three convolutions, which increase in size towards the oral extremity. Segments compressed laterally, arcuate, inflated, from six to ten visible externally and from three to five in final convolution ; segmentation marked externally by lines of sutural constrictions. Surface of test, smooth ; colour an opaque-white. Peripheral margin carinate, sub-carinate, or rounded. Aperture never compound, but Milioline in character, formed by a slight constriction of the chamber cavity, and furnished with a long straight tooth rising from the inferior portion of the peripheral margin of the final chamber, and extends to about half the diameter of the aperture in a line with the medial plane. Adult specimens, $\frac{1}{20}$ in.

The most striking feature of the form now described is the divergence which it exhibits from the generic type in relation to the aperture. *Hauerina*, as a rule, carries a very distinctive cribiform or compound orifice, whilst the present species is conspicuously and (so far as my observation has gone) invariably

Milioline in its oral features. This variation establishes another point of resemblance between *Hauerina* and *Miliolina*, in addition to that which is exhibited by the Milioline arrangement of its earlier segments. Upper Bed, moderately common.

Genus—Vertebralina, *d'Orbigny.*

34. *V. insignis*, Brady. A feeble variety of this rare form occurs in the material, the triangular and carinate periphery, the ornamentation in regular parallel lines, and the absence of rectilineal growth are sufficient to mark the species. This is the first record of it in a fossil state, and it is only known as an existing species from three localities, one of which is Torres Straits. Lower and Upper Beds, rare.

Genus—Articulina, *d'Orbigny.*

35. **A. sulcata*, Rss. Reuss figures a minute and somewhat dubious form under this name from the Tertiaries of Germany. It is known as a recent shell from four "Challenger" stations, one being off Raine Island, Torres Straits. Lower Bed, rare.

36. **A. sagra*, d'Orb. A complete example and the final segment of another were the only indications of this species observed. Lower Bed.

Genus—Orbitolites, *Lamarck.*

37. **O. complanata*, Lamk. Several fragments of fairly large shells were noted, but in each case these were broken and worn by attrition. They are most likely to be derived fossils not proper to the bed. Lower Bed.

Genus—Planispirina, *Sequenza.*

38. *P. sigmoidea*, Brady. This is one of the "Challenger" species, but only noted at five stations. Lower Bed, moderately common. Upper Bed, rare.

39. **P. exigua*, Brady. Two specimens occurred of this minute but interesting little shell. Like the preceding, this is the first record of its occurrence in the fossil condition. Lower Bed, rare.

FAMILY LITUOLIDÆ.

Genus—Lituola, *Lamarck.*

40. †*L. nautiloidea*, Lamk. A single example, showing labyrinthic structure, from Upper Bed.

Genus—Placopsilina, *d'Orbigny.*

41. †*P. Cenomana*, d'Orb. Single specimen from Upper Bed.

Genus—Reophax, *de Montfort.*

42. **R. fusiformis*, Will. The examples of *Reophax* from Muddy Creek are remarkable for the very coarse structure of their tests, being built up of the exuviæ of *M. pygmæa*, *Discorbinæ*, and other foraminiferal shells, and shelly sand. A few single-chambered specimens have been referred to this species, but they are not common. Lower Bed.

43. **R. scorpiurus*, Montfort. One or two tapering and segmented examples may be referred to this species, but it is rarer than the preceding. Lower Bed.

Genus—Haplophragmium, *Reuss.*

44. **H. pseudospirale*, Will. Several relatively large examples, coarsely built, compressed, obscurely segmented, one with subspiral commencement. Lower Bed, rather scarce.

45. **H. agglutinans*, d'Orb. A single specimen has been referred to this species, although it is far from characteristic, being subglobular and without rectilinear segments, but this seems the best classification that can be made at present. Lower Bed.

46. **H. sphæroidiniformis*, Br. *MS.* Mr. Brady has favoured me with the following notes on this, at present, undescribed species:—"I have this in my cabinet (from Mr. Robertson, I think). I believe it to be the Sphæroidine isomorph in the *Haplophragmium* series, just as *H. globigeriniformis* is the Globigerine form of the genus. I have given it the *MSS.* name of *Haplophragmium sphæroidiniformis*. The aperture resembles *Sphæroidina* more than *Textularia*, and some specimens which I have seen are very like *Sphæroidina*—indeed, in all but texture." Lower Bed, common.

Genus—Bdelloidina, *Carter.*

47 **D. aggregata*, Carter. Three examples of this very rare species were met with. Mr. Brady ("Challenger" Report) states that the known distribution of the species was limited to the north coast of New Guinea for recent specimens, and a single Cretaceous specimen in the fossil condition. The forms from Muddy Creek are detached, and show clearly on the underside the peculiar labyrinthic structure of the test. Lower Bed, rare.

Genus—Textularia, *Defrance.*

48. **T. aspera*, Brady. Very fine examples, and in considerable numbers. Lower Bed.

49. **T. gibbosa*, d'Orb. Moderately common, Lower Bed.

50. **T. agglutinans*, d'Orb. Typical specimens of this species are rare in the material, and at best can only be reckoned as passage forms with allied species. Lower Bed.

51. *T. agglutinans*, var. *porrecta*, Brady. Differs from the type

mainly by the chambers being less inflated, the septal lines more nearly flush, the shell elongated, and has a neater and more symmetrical form than *T. agglutinans*. It is in the main a coral-reef form in the recent condition. Lower and Upper Beds, rather scarce.

52. **T. rugosa*, Rss. This is also a characteristic coral-reef species. Lower Bed, rare.

53. *T. sagittula*, Def. One of the commonest forms in this very rich material, many of the specimens attaining a large size. Lower and Upper Beds.

54. **T. sagittula* var. *fistulosa*, Br. A few examples of this variety with fistulose growths on the lateral edges occur, but they are relatively rare. Lower Bed.

55 **T. carinata*, d'Orb. This is a somewhat variable species. A single specimen was noted, which I think must be referred to it, although the septal lines are non-limbate and slightly depressed. The lateral margins are sharply carinate, and give indications of having possessed dentate appendages, although most of these are broken, probably from attrition. Lower Bed.

56. **T. gramen*, d'Orb. A species of the *T. sagittula* type, but much broader in relation to its length, and with greater inflation of the later segments. Lower Bed, rather scarce.

Genus—Pavonina, *d'Orbigny*.

57. **P. flabelliformis*, d'Orb. The only species of the genus founded by d'Orbigny as far back as 1826, and unverified by subsequent researches until recent years. Mr. Brady records it from nine or ten localities, one of which is Torres Straits. It is a compressed, fan-shaped, dimorphous foraminifer; textularian in its earlier segments, the later segments being arranged in single series. This is the first record of its occurrence in a fossil condition. Lower Bed, very rare.

Genus—Verneuilina, *d'Orbigny*.

58. *V. triquetra*, Münst. The specimens show a considerable range as to size and contour, but are always distinctly triangular in shape, with rough exterior. Lower Bed, common. Upper Bed, rare.

59. **V. tricarinata*, d'Orb. More regular in shape than the preceding, and less rugose. Lower Bed, rare.

60. **V. polystropha*. Lower Bed, rare.

61. **V.* sp. A form closely allied to *V. spinulosa*, Reuss, from which it differs chiefly in its more elongated contour, absence of spines, and nearly flush septation. Specimens were submitted to Mr. Brady, who writes that he is "convinced it has been figured,'

although at the time he could not find the description. Lower Bed, rather scarce.

62 †*V. pygmaea*, Egger. Upper Bed, very rare.

Genus—Gaudryina, *d'Orbigny.*

63. **G. rugosa*, d'Orb. Closely resembles *V. triquetra*, from which it differs only in the biserial arrangement of its later chambers. Lower Bed, rather scarce.

Genus—Clavulina, *d'Orbigny.*

64. *C. communis*, d'Orb. Lower and Upper Beds, very rare.

65. *C. angularis*, d'Orb. Lower and Upper Beds, very rare.

Genus—Bulimina, *d'Orbigny.*

66. *B. elegantissima*, d'Orb. A single example was obtained of this beautiful little shell from each of the beds of the Muddy Creek section.

67. **B. obtusa*, d'Orb. A sub-cylindrical variety with obtuse aboral extremity. Occurs as a Cretaceous form in European strata. Lower Bed, very rare.

Genus—Bolivina, *d'Orbigny.*

68. **B. punctata*, d'Orb. Lower Bed, rather scarce.

69. **B. limbata*, Br. In the recent condition this is a common form on the New Guinea coasts and the Australian coral-reef. Lower Bed, rare.

70. **B. dilatata*, Rss. Two specimens, which are not altogether characteristic, have been assigned to this species. They are apparently intermediate forms uniting *B. dilatata* with *B. pygmaea*, Br. Lower Bed.

Genus—Cassidulina, *d'Orbigny.*

71. *C. subglobosa*, Br. In the recent condition it has a deep water habitat. Common in Lower Bed, but of small size. Upper Bed, very rare.

72. **C. lævigata*, d'Orb. Lower Bed, rare.

Genus—Ehrenbergina, *Reuss.*

73. **E. serrata*, Rss. Lower Bed, rather scarce.

FAMILY LAGENIDÆ.

Genus—Lagena, *Walker & Jacob.*

74. **L. hexagona*, Will. A single specimen. Lower Bed.

75. *L. sulcata*, W. & J. Lower Bed, rare. Upper Bed, very rare.

76. **L. globosa*, Montag. Lower Bed, rare.

77. **L. lineata*, Will. A single specimen. Lower Bed.
78. **L. marginata*, W. & B. Lower Bed, rare.
79. †*L. melo*, d'Orb. Upper Bed, very rare.

Genus—Nodosaria, *Lamarck.*

The representatives of this genus in the material, although not common as to individuals, represent a relatively large number of species, and include some specimens of unusual size. In classification I have followed Mr. Brady's method of including the Dentaline and Glanduline varieties under the present heading.

80. **N. soluta*, Rss. Fine typical specimens. Lower Bed, rare.
81. *N. pauperata*, d'Orb. One example (faintly striated) is one-sixth of an inch in length. Lower and Upper Beds, rare.
82. **N. scalaris*, Batsch. The specimens are mostly limited to two or three chambers. Lower Bed, rather scarce.
83. **N. multilineata*, Borne. A few fine examples occur. Lower Bed.
84. **N. obliqua*, Linné. Lower Bed, rare.
85. **N. plebeia*, Rss. A single specimen. Lower Bed.
86. **N. costulata*, Rss. A single example, consisting of three inflated chambers, apiculate, and with strongly developed costæ bridging the sutural depressions. Lower Bed.
87. **N. affinis*, d'Orb. One large example of this species measures five-sixteenths of an inch in length. It consists of seven segments, with a constriction near the middle of the test, which gives it the appearance of being nearly nipped in two. Lower Bed, rare.
88. *N. raphanus*, Linné. Not common. One example measures a quarter of an inch in length. Lower and Upper Beds.
89. †*N. consobrina*, d'Orb. Upper Bed, very rare.
90. †*N. (G.) æqualis*, Rss. Upper Bed, rare.
91. *N. (G.) læviyata*, d'Orb. Lower Bed, rare. Upper Bed, very rare.

Genus—Lingulina, *d'Orbigny.*

92. **L. carinata*, var. *seminuda*, Batsch. A single very fine example, consisting apparently of only two segments. Lower Bed.

Genus—Marginulina, *d'Orbigny.*

93. **M. costata*, Batsch. Lower Bed, rather scarce.

Genus—Frondicularia, *Defrance.*

94. *F. complanata*, Def. Lower Bed, rare. Upper Bed, very rare.

Genus—Vaginulina, *d'Orbigny.*

95. **V. linearis*, Montag. Lower Bed, very rare.

Genus—Rhabdogonium, *Reuss.*

96. †*R. sp.* Two shells, one a remarkably fine example of a *Rhabdogonium* with symmetrical outline and strongly developed tricarinate test, were obtained from the Upper Bed. I have little doubt that they represent an undescribed species, but the specimens have been unfortunately mislaid, and therefore cannot be determined at present.

Genus—Cristellaria, *Lamarck.*

97. **C. rotulata*, Lamk. Lower Bed, rare.
98. **C. cultrata*, Mont. Lower Bed, rare.
99. **C. articulata*, Rss. Lower Bed, rather scarce.
100. **C. convergens*, Borne. Lower Bed, very rare.
101. **C. tricarinella*, Rss. Lower Bed, rare. Recent specimens have been obtained from three localities, all in the Western Pacific.

Genus—Polymorphina, *d'Orbigny.*

102. **P. regina*, Br. P. & J. A few rather fine examples. Lower Bed.
103. *P. elegantissima*, P. & J. This fine species is most at home in recent waters on the eastern shores of Australia from Torres Straits to Bass Straits. In the Muddy Creek beds it is a common form, but very variable in contour. Specimens can be found in every intermediate stage, from a nearly circular outline in one direction to sub-cylindrical in elongated varieties. Lower and Upper Beds, common.
104. *P. oblonga*, d'Orb. Lower Bed, very rare. Upper Bed, rather scarce.
105. *P. gibba*, d'Orb. Lower Bed, a moderately common form, including some fistulose examples. Upper Bed, rather scarce.
106. *P. lactea*, W. &. J. Rare in both Lower and Upper Beds.
107. **P. lactea*, var. *oblonga*, Will. Lower Bed, very rare.
108. *P. communis*, d'Orb. Rather scarce in both Lower and Upper Beds.
109. **P. ovata*, d'Orb. Lower Bed, rare.
110. **P. dispar*, Stache. A strong, compressed, inequilateral and twisted shell, determined by Prof. Stache from examples obtained from the New Zealand Tertiaries. Lower Bed, moderately common.
111. †*P. rotundata*, Born. Upper Bed, rare.
112. †*P. compressa*, d'Orb. Upper Bed, moderately common.

Genus—Uvigerina, *d'Orbigny.*

113. **U. Canariensis*, d'Orb Lower Bed, rather scarce.
114. † *U. pygmaea*, d'Orb. Upper Bed, very rare.

Genus—Sagrina, *d'Orbigny.*

115. **S. limbata*, Br. Pl. i., fig. 7. A single specimen of this very rare form was obtained from the Lower Bed. The test is longer and more slender than Mr. Brady's figure, and is also more curved in outline, but in all essential features agrees perfectly with the type. The specimens on which the species was determined by Mr. Brady came from Torres Straits, and this is only one of the many illustrations of the identity of forms between the last-named locality and the Lower Tertiaries of Southern Australia.

FAMILY GLOBIGERINIDÆ.

Genus—Globigerina, *d'Orbigny.*

116. *G. bulloides*, d'Orb. Lower Bed, very common. Upper Bed, rare.

117. **G. bulloides* var. *triloba*, Rss. Lower Bed, rather scarce.

118. **G. inflata*, d'Orb. Lower Bed, rather scarce.

119. **G. helicina*, d'Orb. Lower Bed, rare.

Genus—Orbulina, *d'Orbigny.*

120. *O. universa*, d'Orb. Lower Bed, very common, frequently large. Upper Bed, rather scarce.

Genus—Sphæroidina, *d'Orbigny.*

121. **S. bulloides*, d'Orb. Lower Bed, examples small but moderately common.

FAMILY ROTALIDÆ.

Genus—Spirillina, *Ehrenberg.*

122. **S. decorata*, Br. Differs from the recent form in possessing a rounded edge instead of being carinate, and in the absence of transverse furrows. Lower Bed, rare.

123. *S. tuberculata*, Br. Mr. Brady's figures show the convolutions as visible on the exterior surface, wholly or in part, but the Tertiary examples have a greater tubercular growth which completely hides the septal lines, and often renders the shell slightly biconvex. Lower Bed, rather scarce. Upper Bed, very rare.

124. **S. limbata*, Br. Lower Bed. Specimens small and somewhat rare.

125. **S. inæqualis*, Br. The convolutions of the superior face are strongly marked by raised, limbate ridges, with the depressed areas coarsely pitted. The inferior side of the shell is of greater extent than the superior, perfectly flat, shows no septal lines exteriorly, and is uniformly covered with tubercles. Lower Bed, rather scarce.

Genus—Discorbina, *Parker & Jones.*

The Discorbinæ of the Lower Bed are represented by a considerable number of species, but as individuals are almost without exception small and starved examples and in limited numbers. In the Upper Bed they are finer examples, and more numerous, and include several species not found in the Lower Bed.

126. *D. turbo*, d'Orb. Lower Bed, rather scarce; Upper Bed, very common.

127. *D. rosacea*, d'Orb. Rather scarce in both Beds.

128. *D. globularis*, d'Orb. Lower Bed, rather scarce; Upper Bed, rare.

129. **D. Araucana*, d'Orb. Lower Bed, rare.

130. **D. Bertheloti*, d'Orb. Lower Bed, rare.

131. *D. biconcava*, P. & J. Much compressed bilaterally. Lower Bed, rare; Upper Bed, rather scarce.

132. **D. patelliformis*, Br. Lower Bed, rather scarce.

133. **D. orbicularis*, Terq. Lower Bed, rare.

134. **D. (?) tabernacularis*, Br. If this be rightly assigned, it is a feeble example destitute of limbation, although resembling the species in other respects. Lower Bed, rare.

135. *D. polystomelloides*, P. and J. Lower Bed, a single example of this fine species. Upper Bed, rather scarce.

136. †*D. pileolus*, d'Orb. Upper Bed, rather scarce.

137. †*D. vesicularis*, Lamk. Upper Bed, rare.

128. †*D. Vilardeboana*, d'Orb. Upper Bed, moderately common.

139. †*D. opercularis*, d'Orb. Upper bed, rare.

140. †*D. rarescens*, Brady. Upper Bed, rare.

141. **D. cruciformis*, sp. nov. Pl. i., figs. 13, 14.

Test subglobular, slightly compressed laterally, consisting of about three convolutions arranged inequilaterally on a Rotaliform plan, so that usually four segments are visible on the inferior and about eight on the superior face. Segments inflated, their convex surfaces on the superior face studded with short thickly-set spines; sutural lines depressed, excavated, and free from spines. Inferior surface smooth, its four segments arranged in form of a Maltese cross. Umbilicus depressed. Aperture a small circular orifice situated in the umbilical depression. Average size, $\frac{1}{45}$ in.

This peculiar little shell is obese, but unequally convex. Its superior surface is rendered rugose by the presence of short spines so thickly set that they cannot be distinguished as spinous growths except by viewing them laterally where they terminate in an abrupt line. Its nearest analogue is perhaps *Discorbina pulvinata*, a new species obtained by Mr. Brady from two localities in Challenger material, viz., Admiralty Islands and Torres Straits. The species now described can be easily distinguished from the one referred to by its greater number of chambers, the

absence of ornamentation from its inferior surface, and the cruciform aspect which the final whorl of chambers assumes. Lower Bed, moderately common.

Genus—Planorbulina, *d'Orbigny.*

142. **P. mediterranensis*, d'Orb. Lower Bed, rare.

143. **P. acervalis*, Br. Lower Bed, a single example, but characteristic.

144. **P. larvata*, P. and J. A very symmetrical discoid test, often developing on superior surface tubercular growth of shell substance. In the recent condition it is an exclusively tropical species. The specimens from Muddy Creek are rarely tuberculated, but exhibit a smooth flat test with regularly imbricated margin. Lower Bed, moderately common.

Genus—Truncatulina, *d'Orbigny.*

145. **T. lobatula*, W. and J. Lower Bed, rather scarce.

146. **T. variabilis*, d'Orb. Several irregular-growing examples have been referred to this species. Lower Bed, rare.

147. *T. reticulata*, Czjzek, Lower Bed, moderately common. Upper Bed, rare.

148. **T. echinata*, Br. A globose shell with large circular aperture, the surface of test more or less studded with short blunt spines irregularly distributed. In the recent condition it is mostly a coral-reef species. Lower Bed, rather scarce.

149. *T. echinata*, var. *lævigata*, var. nov. Pl. i., fig. 8.

Closely resembles the typical form in general features, but is devoid of all spinous appendages, the exterior surface of test being perfectly smooth. The aperture is also less conspicuous than in *T. echinata*, and has no bordered rim as in that form. It is more common than the type in the Muddy Creek material, and as such seems to require at least a varietal distinction. Lower Bed, moderately common. Upper Bed, rare.

150. *T. Ungeriana*, d'Orb. Lower Bed, common. Upper Bed, rather scarce.

151. *T. Haidingerii*, d'Orb. Lower Bed, rather scarce. Upper Bed, rare.

Genus—Anomalina, *d'Orbigny.*

152. **A. rotula*, d'Orbigny. Lower Bed, rare.

153. *A. ammonoides*, Rss. Lower Bed, moderately common. Upper Bed, rare.

154. **A. polymorpha*, Costa. Three examples, two of which are spinous. Lower Bed.

Genus—Carpenteria, *Gray.*

155. **C. proteiformis*, Goës. Very fine examples up to two-fifths

of an inch in length. Large specimens sometimes branched, and contain over twenty chambers. This is the first record of this interesting species in a fossil condition. The nearest point of distribution in the recent state, so far as known, is Torres Strait, but the recent specimens do not appear to be so fine as those from Muddy Creek. Lower Bed, moderately common.

Genus—Polytrema, *Risso.*

156. *P. miniaceum*, var. *alba*, Carter. Small specimens, and destitute of colour. Whether the absence of colour be original or due to age and fossilization it is difficult to say. I have, however, classed them with the variety with which, in their present appearance, they perfectly agree. Lower Bed, moderately common. Upper Bed, very rare.

Genus—Gypsina, *Carter.*

157. *G. globulus*, Rss. The spherical form of *Gypsina* differs widely as to the size of individuals, and is not uncommon in Lower Bed. Upper Bed, rather scarce.

158. *G. vesicularis*, P. & J. Examples of the typical hemispherical form are rare, these being replaced by individuals of a discoid shape, with thick rounded periphery, which are common in the Lower, and rather scarce in Upper Bed.

159. **G. inhærens*, Schultze. Lower Bed, rare. The "Challenger" collections of this species were limited to two localities, Bass Straits and south of New Guinea.

Genus—Pulvinulina, *Parker* and *Jones.*

160. *P. repanda*, Fichtel and Moll. The typical form, passing into and including the next in this list, are amongst the commonest forms in the Lower Bed material. Upper Bed, rather scarce.

161. **P. pulchella*, d'Orb. A very neat little shell, with limbate sutures. Lower Bed, common.

162. **P. Schreibersii*, d'Orb. The septation on the superior side of the test is obscure, but in other respects the examples agree with the above. Lower Bed, rather scarce.

163. **P. Berthelotiana*, d'Orb. A few specimens of a small, convex, many chambered, limbate shell, appear to belong to this species. Lower Bed.

164. **P. Partschiana*, d'Orb. Lower Bed, rather scarce.

165. **P. Patagonica*, d'Orb. Lower Bed, rare.

166. **P. Hauerii*, d'Orb. Lower Bed, rare.

167. **P. auricula*, Fichtel and Moll. Lower Bed, rare.

168. **P. oblonga*, Will. Lower Bed, rare.

169. **P. semiornata*, sp. nov. Pl. i., figs. 12*a*—*c*. Test subglobular, more or less compressed on superior face; periphery, obtuse

or rounded ; convolutions few in number (generally three). Segments few (three or four in final convolution), and much inflated. Superior surface, ornamented by raised papillæ, or by thick exogenous shell-growth, with deep excavations at intervals, giving a roughly reticulate appearance to the test. Inferior surface highly convex, without ornamentation, and smooth. Sutures non-limbate, marked externally by depressed lines. Umbilicus slightly excavated, and usually possesses several large perforations. Aperture, an inconspicuous slit (sometimes spanned by shelly growths), situated on the umbilical margin of final segment. Large specimens measure $\frac{1}{16}$ inch.

A large shell, combining in some degree the external features of *Rotalia papillosa*, Br., and *Pulvinulina punctulata*, d'Orb. It can be easily distinguished by its nearly plano-convex outline, inflated chambers, and fewness of its segments. Its size renders it conspicuous in the material, but it is not very common. Lower Bed.

Genus—Rotalia, *Lamarck.*

170 *R. clathrata*, Br. One of the new species of the "Challenger" collection. The home of this very striking form appears to be between Bass Straits and Cooks Straits, New Zealand, where it was taken at four stations, with a bathymetrical range of 275 fathoms. The only other note of its occurrence is at two stations on the west coast of Patagonia, but the specimens from the latter locality were small and not so characteristic. At Muddy Creek it is moderately common in Lower Bed and very common in Upper Bed.

171. **R. papillosa*, Br. With a single exception this is only known as a South Pacific species. The Challenger Report records it from eight stations, the majority of which occur in the neighbourhood of New Guinea and northern and eastern coasts of Australia. It is a rare form in the Lower Bed material, and the examples are not quite so globose in outline as the type.

172. **R. papillosa* var. *compressiuscula*, Br. A few not very characteristic examples occur. They are really passage forms between the present variety and *R. clathrata*. In the recent state it is usually associated with the type in distribution. Lower Bed, rare.

173. **R. calcar*, d'Orb. Lower Bed, rare.

Genus—Calcarina, *d'Orbigny.*

174. †*C. rarispina*, d'Orb. The examples usually exhibit from three to six spines. Upper Bed, moderately common.

FAMILY NUMMULINIDÆ.

Genus—Nonionina, *d'Orbigny.*

175. **N. umbilicatula*, Montagu. Lower Bed, rather scarce.

176. *N. depressula*, W. & J. Rare in both Lower and Upper Beds.

177. **N. stelligera*, d'Orb. Lower Bed, rather scarce.

Genus—Polystomella, *Lamarck.*

178. *P. macella*, F. & M. A very common form in the Lower Bed material, including some fine examples. It seems to take the place of the more widely diffused *P. crispa*. Upper Bed, rather scarce.

179. *P. craticulata*, F. & M. Occurs as a recent form on the Australian Coral Reef. Rare in both Lower and Upper Beds.

180. **P. verriculata*, Br. Only known in the recent state from two localities off East Moncœur Island (Bass Straits) and Curtis Straits, Queensland. Lower Bed, rare.

181. †*P. imperatrix*, Br. The examples, although fine and striking, are not, as a rule, very characteristic. One example was noticed with well-developed spines. The test is invariably subangular, but rarely spinous. It is probably a varietal or intermediate form which cannot be more accurately classed. Upper Bed, common.

Genus—Amphistegina, *d'Orbigny.*

182. *A. Lessonii*, d'Orb. Mostly of the compressed variety. Lower Bed, moderately common. Upper Bed, rather scarce.

Genus—Operculina, *d'Orbigny.*

183. **O. complanata*, Def. Specimens large and very common in Lower Bed.

184. **O. complanata*, var. *granulosa*, Leymerie. Examples with more or less of surface ornamentation are also common. Lower Bed.

Genus—Nummulites, *Lamarck.*

185. *N. variolaria*, Sowerby. This is the most common and striking of the foraminiferal forms in the Muddy Creek Lower Bed. Its occurrence in company with several other large and striking species gives the Lower Tertiary of Australia a foraminiferal facies very closely resembling beds of a similar age in the Northern Hemisphere. It occurs sparingly, along with examples of *Operculina*, in the Upper Bed, but it is very probable that both these forms in the Upper Bed have been derived from the older formation.

Genus—Orbitoides, *d'Orbigny.*

186. **O. Mantelli*, Morton (sp.). Mostly small specimens, common in the Lower Bed. One example is much larger than the average size, and is $\frac{9}{20}$ in. in diameter. A few subglobular examples, surrounded with fringe of delicate translucent chamberlets, might perhaps be referred to *O. dispansus*, Sow.

187. **O. stellata*, sp. nov. Pl. i., figs. 9—11. Test free, compressed, lenticular; peripheral margin attenuate, angular in outline, or produced at more or less regular intervals into flat spinous projections. Surface of test rough and vesicular, destitute of areolæ, but in well preserved specimens exhibits externally a few tubercles of clear shell substance. Primordial region occupied by one or more chambers of large size; chamberlets of medial disc, numerous, cylindrical, or roughly hexagonal in section, arranged in concentric annuli; investing chamberlets compressed laterally, arranged in successive layers on either side of the medial plane; septal partitions thin, except where columns of clear shell substance pass radially from the primordial region to the external surface of test. Spinous projections formed by intermittent extensions of chamberlets at the peripheral margin. Average size, $\frac{1}{8}$ inch.

This is an interesting modification of the genus in the direction of *Tinoporus*, but whilst simulating the latter in external appearances, it is destitute of the supplemental skeleton characteristic of that genus; and is clearly differentiated from both *Tinoporus* and *Gypsina* by possessing the duplex arrangement of segments, which marks-off *Orbitoides* so clearly from these genera. The periphery is sometimes produced into a thin carina composed of a single layer of chamberlets, which from their regularity of shape and disposition can be determined as extensions of the medial disc. The spinous projections, whilst seldom entirely absent, vary considerably in their number and arrangement. Specimens occur having the outline of an inequilateral triangle, and pass through every degree of variation in angular outline to that of a symmetrical arrangement of radiating spines, as in fig. 9, pl. i.; the thickness of the walls separating the chamberlets is relatively much less in comparison with the chamber cavities than is commonly the case in this genus, as shown in pl. i., fig. 10*b*. The primordial region, when examined in flat sections, is seen to consist of several large inflated and spirally arranged segments, which are not visible in the transverse section shown in fig. 10*a*. Figs. 11*a*—11*b* represent a large and very abnormal specimen assumed to belong to this species, having two medial planes growing at right angles to each other, so as to give a triangular or prismatic form to the text when seen in transverse section. Lower Bed, common.

General Remarks.

With regard to the Foraminifera, the Muddy Creek Beds contain one of the richest local fauna that is known, either recent or fossil. The rich gatherings from the Suffolk Crag (Pliocene) yielded 100 species, and the greatest number of species from any one locality in the British area in this formation was 62 species. The Lower Bed at Muddy Creek has yielded 163 species, and the Upper Bed 76 species. Of these 52 species are common to both formations, leaving a net total of 180 species and seven varieties for the section as a whole. Mr. Brady ("Challenger" Report) makes special mention of a remarkably rich dredging off Raine Island, Torres Straits, which contained a greater number of species in this class than any other haul made during the cruise, and included many rarities. There is a close resemblance in the number of species obtained from Torres Straits and Muddy Creek, whilst many of the rarer forms are common to both.

The stratigraphical distinction between the two beds of the section concerned is sufficiently marked from the fact that the Foraminifera common to both only amount to 28 per cent. of the whole. There is also a marked change in the general facies of the rhizopodal fauna as we pass from the lower to the upper geological horizon, pointing to a shallowing of the sea bottom, which is indicated not only by the relatively larger numbers of shallow-water species in the Upper Bed, but these are proportionately more numerous and better developed as individuals.

With regard to climatic conditions, the majority of the Muddy Creek Foraminifera point to a higher temperature prevailing in the locality of their deposition than is proper to such latitudes in the present day. A very large proportion of species are characteristically tropical, and a decided majority in each case have their geographical range, in the present, restricted to the tropical and warmer temperate zones. So far as can be determined, the following summary will illustrate the bathymetrical and climatic distribution of the species concerned :—

Bathymetrical Range.

Lower Bed—68 (49 per cent.) shallow; 39 (28 per cent.) moderately deep to deep; 32 (23 per cent.) unrestricted.

Upper Bed—42 (58 per cent.) shallow; 12 (16 per cent.) moderately deep to deep; 18 (25 per cent.) unrestricted.

Climatal Range.

Lower Bed—37 (26 per cent.) tropical ; 47 (33 per cent.) warm temperate and tropical; 9 (6 per cent.) temperate; 48 (34 per cent.) cosmopolitan.

Upper Bed—13 (18 per cent.) tropical; 25 (35 per cent.) warm temperate and tropical; 2 (3 per cent.) temperate; 31 (43 per cent.) cosmopolitan.

In their geological range; the Lower Bed contains six species which date from Palæozoic times, five Trias, eight Lias, four Jurassic, 18 Cretaceous, 68 Tertiary, five Quaternary, whilst 37 have not been previously noted in a fossil condition, and three others only in Australian geology.

In the Upper Bed two have a Palæozoic record, three Trias, five Lias, three Jurassic, eight Cretaceous, 27 Tertiary, and 14 not previously observed as fossil forms.

The occurrence of *Nummulites variolaria* in very great numbers in the Lower Bed is of special interest as showing uniformity of palæontological features between the Older Tertiaries of Australia and rocks of a like age in Europe. The resemblance in this respect is still further shown by the occurrence of large examples of *Operculina* and other types which are commonly found associated with *Nummulites* in the Eocene Beds of the Northern Hemisphere, and which are also conspicuous species from Muddy Creek.

In the material gathered by the "Challenger" expedition, the Australasian region supplied a high proportion of the new species obtained in this department of marine zoology. It was therefore to be expected that the later geological formations of Australia would show more or less resemblance to the dredgings in the adjacent waters, and give geological examples of some of the new species found in a recent condition. Including the new forms described in this paper, 50 species occur in the list which are now recognised for the first time as fossils. The general resemblance, which the Muddy Creek Foraminifera bear to the recent species now inhabiting the northern and north-eastern shores of tropical Australia, is very striking, and would appear to indicate that in early Tertiary times either the tropical currents of the ocean bore more directly on the southern shores of the continent, or that the zone of tropical heat reached nearer to the Pole in the Southern Hemisphere, as it appears to have done in the Northern, at the beginning of the Tertiary period.

DESCRIPTION OF PLATE I.

Figs. 1—3. *Miliolina angularis*, sp. nov.

Fig. 1. Longitudinal aspect. Exterior of test broken on one facet exhibiting the shallowness of chamber cavity. x 17 diam. Fig. 2. Transparent longitudinal section. x 22 diam. Fig. 3. Transparent transverse section, made near the centre of test, exhibiting the spiralline arrangement of chambers and angular contour of shell. x 40 diam.

Figs. 4—5. *Spiroloculina Tateana*, sp. nov.

Fig. 4*a*. Lateral view of an oval specimen, x 33 diam. Fig. 4*b*. Peripheral aspect of ditto. Fig. 5. Lateral aspect of circular example. x 30 diam.

Figs. 6*a*—6*b*. *Hauerina intermedia*, sp. nov.

Fig. 6*a*. Lateral view of average specimen. x 20 diam. Fig. 6*b*. Peripheral aspect of same object.

Fig. 7. *Sagrina limbata*, Br. x 30 diam.

Fig. 8. *Truncatulina echinata* var. *lævigata*, var. nov. x 40 diam.

Figs. 9.—10*b*. *Orbitoides stellata*, sp. nov.

Fig. 9. Lateral aspect of regularly stellate example. x 13 diam. Fig. 10*a*. Transparent section through centre of test at right angles to medial plane. x 17 diam. Fig. 10*b*. Small portion of same section more highly magnified showing column of clear shell substance and the relative thinness of chamber walls. x 75 diam.

Figs. 11*a*—11*b*. Probably an abnormal example of *Orbitoides stellata*, possessing two medial planes growing at right angles to each other. x 12 diam.

Figs. 12*a*—12*c*. *Pulvinulina semiornata*, sp. nov.

Fig. 12a. Superior aspect showing rugose shell growth. x 30 diam. Fig. 12*b*. Inferior aspect of same object entirely destitute of ornamentation. x 25 diam. Fig. 12*c*. Peripheral view. x 25 diam. The final segment in this example is broken and a specimen of *Lagena sulcata* has become fixed in aperture of test, as shown by figs. 12*b* and *c*.

Figs. 13—14*b*. *Discorbina cruciformis*, sp. nov.

Fig. 13. Superior aspect of test. x 40 diam. Fig. 14*a*. Peripheral view of another example. x 40 diam. Fig. 14*b*. Inferior aspect of ditto.

Description of a New Genus and Species of Locustidæ.

By J. G. O. Tepfer, F.L.S.

[Read June 7, 1889.]

Hectoria, *gen. nov.*

Male (imago and nymph).—Body stout, short, somewhat compressed laterally.

Head rather small; vertex raised, somewhat globose above, and forming a short ridge between the antennæ, with abrupt sides, a fine furrow lengthwise, and separated by transverse furrows at either end.

Eyes rather small, very prominent, ocelli not apparent.

Palpi long, slender, joints cylindrical, last joint slightly thickened towards extremity; tips rounded.

Antennæ extremely slender, setaceous, fully twice the length of the body or more, finely ciliated towards the tips; base below and inwards surrounded by a narrow ridge; joints cylindrical, very numerous; first joint very stout, a little longer than thick; second somewhat shorter and half as thick; third again diminished in the same proportion; the remainder nearly of the same length and gradually tapering to the end.

Thorax stout, narrow; sides straight, flat. Prothorax with a steep saddle-like depression near the front, continued along the side in the form of two or three shallow closely adjoining furrows; anterior part raised, hood-like, triangular, hollow in front, and terminating in an acute point; posterior pronotum about four times longer, lateral edges indistinct, raised semi-globosely, and terminating in a stout, oblique, conical spine on each side. The middle dorsal shield extends somewhat beyond the base of the forewings, where the lateral margins ascend obliquely at an angle of about 40°, meeting at a sharp point over the base of the abdomen. The middle of the pentagonal area is occupied by a high lentil-shaped hollow crest, with a circular, notched margin in front and above; its surface is traversed by six distinct main veins starting from the base near the front, which emit a few longitudinal branches, and more numerous but less distinct transverse veins. The sides descend very low, the rounded margins forming a narrow recurved ridge. The meso-and metathorax are much higher and stronger than the prothorax, the sides flat, straight, and separated by deep furrows. The pro- and meso-

sternum are narrow, depressed in the middle, the coxæ surrounded by distinct ridges; the metasternum entirely obliterated by the coxæ of the hind legs.

Legs slender, long; the posterior pair about two and a half times the length of the body, more or less angular. Tibiæ of all and the femora of the hind legs spiny. Tarsi four-jointed, stout; claws long and slender. Auditory areolet oval, large, free.

Abdomen compressed, subconical, twice the length of head and thorax together; segments, ten dorsal and eight or nine ventral, former along medial line overlapping and forming acute points; ventral plates subquadrate, surrounded by a narrow ridge. Anal plate deeply emarginate; cerci short, finely ciliate, and curved inwards.

Tegmina and wings more than twice the length of the body; slope very steep, except that of the interior area of the tegmina, which alone is horizontal in repose. The latter are thin, leathery, translucent, convex in front, concave behind, nearly of equal width throughout, tips rounded, border oblique; the costal area is broadly lanceolate near the base, contracts rapidly, and then narrowly linear to the tip; the inferior area is triangular, broad at the base, but short, being scarcely one-fifth of the total length of the tegmina, and almost wholly occupied by the stridulating apparatus, consisting of several strong longitudinal veins (with slighter ramifications through the transparent membrane) in the right wing, and a very stout transverse vein, with some smaller in the left one. The discal area is several times larger than the others together, and nearly of the same width throughout, except near the base. Subcostal vein very strong, transverse branches stout, often in pairs, ultimate reticulations very numerous, meshes irregular.

Hindwings somewhat longer than tegmina, transparent, and delicate; tips rather acute, border very oblique, interior margin short; thirteen almost straight radiating veins, of which only the subcostal emits oblique branches, all being connected by mostly rectangular, simple, more or loss straight transverse branches.

Hectoria Pontoni, *sp. nov.*

Pale dull green. Eyes dark brown, shining. Crest yellowish-green, margin deep brown to black. Tegmina, costal area with obliquely transverse brown lines and spots; discal area with nine or ten short broad transverse brown bars (some double, others irregular) between the subcostal and medial veins, besides eleven narrowly linear ones beyond the latter, and a number of small spots near the border and interior margin. Legs banded with brown; femora of the anterior and medial legs have three, the tibial two bands, those of the posterior legs four bands each, the last ad-

joining the tarsi, which are also brown. The femora of the fore-legs are smooth, those of the middle and hindlegs with two rows below, the two preceding the last much larger, and connected by a thin high ridge. The tibiæ of the fore and middle legs have two inferior rows, the hindlegs superior, about fourteen in each, and nearly of the same size. All the spines correspond in colour with the part adjoining.

The male nymph is similarly marked, but the darker brown preponderates, while the dull green is replaced by yellowish tints. The imperfect wings are rather long, promiscuously directed obliquely upwards, and closely applied to each other over the back. The crest is nearly as well developed as in the adult. Length of body, one inch ; span of wings, four and a half to five inches.

This genus will have to be placed near to *Phylloptera* and *Phaneroptera*, with which it agrees in general habitus, but it has also through the dorsal appendages some affinity with *Heterodes* and *Megapoda*—in fact, it removes one of the distinctions between the Locustidæ and Acrididæ, viz., the absence of crests in the former and presence in the latter. However, the form of the antennæ, palpi, tarsi, &c., place it unquestionably among the former.

The first intimation of this very interesting insect was received through Mr. J. M. Bagot, who forwarded a nearly mature male nymph to the Museum, obtained in December, 1885, about Terowie. The next, an adult male, was captured by Mr. F. H. Ponton, near Beltana, during the early part of last May. The finder informed me that he captured it in his room one evening, where it, no doubt, was attracted by the light. These are the only specimens known. The female will most likely be little different in general aspect, but furnished with a long ovipositor. The habitual food plant will probably be some of the Melaleuca species or else the Native Pine.

On some South Australian Polyzoa.

By P. H. MacGillivray, M.A., M.R.C.S., F.L.S., Corr. Memb.

[Read June 7, 1889.]

Plate II.

The present paper contains a list of South Australian Polyzoa, which I have recently had occasion to examine. They were mostly contained in a parcel sent for identification from the Adelaide Museum, but include also some given to me by the Rev. Dr. Porter. The total number of species is 64, of which four are now described for the first time. It is hoped that this very imperfect list may serve as a nucleus to which South Australian naturalists will add many of the other species which undoubtedly occur on their coasts.

The Australian seas are peculiarly rich in Polyzoa, from Victoria alone upwards of 360 species having already been recorded. Most of these have been obtained in the neighbourhood of Port Phillip Heads, where, mainly owing to the skill and indefatigable industry of Mr. J. Bracebridge Wilson, a more extensive series has been found than is known to occur in any equal extent of sea elsewhere. There is every reason to believe that parts of the South Australian coasts, notably the Backstairs Passage, when systematically explored, will yield an equally rich harvest.

CLASS POLYZOA.

Order I.—Phylactolæmata, *Allman*.

Suborder I.—Lophopea, *Allman*.

FAMILY PLUMATELLIDÆ.

Plumatella, *Lamk*.

P. Aplinii, McG. Torrens River.

Order II.—Gymnolæmata, *Allman*.

Suborder I.—Cheilostomata, *Busk*.

FAMILY AETEIDÆ.

Aetea, *Lamx*.

A. anguina, Linn., sp. Encounter Bay.
A. recta, Hincks. Glenelg.

FAMILY CATENICELLIDÆ.

CATENICELLA, *Blainville.*

C. lorica, Busk. Glenelg.

C. ventricosa, Busk. St. Vincent's Gulf; Encounter Bay.

C. hastata, Busk. Glenelg; St. Vincent's Gulf.

C. cribraria, Busk. St. Vincent's Gulf; Encounter Bay

C. rufa, McG.

C. margaritacea, Busk. Glenelg; St. Vincent's Gulf; Spencer's Gulf.

C. elegans, Busk. Glenelg; St. Vincent's Gulf; Spencer's Gulf.

C. Dawsoni, Wyv. Thomson. Some fragments occur which seem referable to this somewhat doubtful species.

C. fusca, McG.

C. crystallina, Wyv. Thomson.

CALPIDIUM, *Busk.*

C. ponderosum, Goldstein, sp. St. Vincent's Gulf.

FAMILY CELLULARIIDÆ.

CELLULARIA, *Pallas.*

C. cuspidata, Busk.

SCRUPOCELLARIA, *Van Beneden.*

S. scrupea, Busk. Some very imperfect fragments.

MENIPEA, *Lamx.*

M. crystallina. Busk, sp. St. Vincent's Gulf.

M. Porteri, n. sp. Pl. ii., figs. 1—1*b*.

Zoarium dichotomously branched, branches articulated by double tubes. Zoœcia biserial, about 5-7 in an internode, elongated and narrowed downwards; aperture elliptical and occupying about two-thirds of the front, margin slightly thickened; three spines, the lower clavate or bifurcate, on the outer side above, and two simple spines on the inner side; scutum large, lamina expanded, peduncle narrow. Lateral avicularia rare, large, situated on the upper part of a zoœcium, rostrum with a sharp, curved beak, the narrow mandible directed horizontally outwards. No anterior avicularia. Œcia large, rounded, with a row of round foramina along the upper edge.

This species, which I dedicate to the Rev. Dr. Porter, from whom I first received a specimen, grows in small tufts, not exceeding half an inch in height, on algæ. The scutum is large, somewhat reniform and saccular. The lateral avicularia are rather scarce, many internodes not showing them and others having only one; they are of large size, although not always so

large as that figured. There are no anterior avicularia. The oœcia are large, pearly, and have an irregular row of foramina along the upper edge.

FAMILY SALICORNARIIDÆ.

CELLARIA, *Lamx.*

C. australis, McG. St. Vincent's Gulf.
C. rigida, McG. Kangaroo Island.

FAMILY BICELLARIIDÆ.

BICELLARIA, *Blainville.*

B. grandis, Busk. St. Vincent's Gulf.

STIRPARIA, *Goldstein.*

S. glabra, Hincks.

BUGULA, *Oken.*

B. cucullata, Busk. Brighton; Kangaroo Island; St. Vincent's Gulf.
B. dentata, Lamx.
B. neritina, Linne, sp.

FAMILY FLUSTRIDÆ.

FLUSTRA, *Linn.*

F. denticulata, Busk.

CARBASEA, *Gray.*

C. pisciformis, Busk. St. Vincent's Gulf.

FAMILY MEMBRANIPORIDÆ.

ELECTRA, *Lamx.*

E. flagellum, McG. A very imperfect specimen.

BATHYPORA, *McG.*

B. bicolor, Hincks, sp. (*Membranipora bicolor*, Hincks, in Ann. & Mag. Nat. Hist., Feb., 1881.)

MEMBRANIPORA, *Blainville.*

M. pyrula, Hincks. St. Vincent's Gulf.

AMPHIBLESTRUM, *Gray.*

A. permunitum, Hincks, sp. St. Vincent's Gulf.

FAMILY MICROPORIDÆ.

THAIROPORA, *McG.*

T. Woodsii, McG. Glenelg.

T. Jervoisii, Hincks, sp. St. Vincent's Gulf.

T. Whittelli, n. sp.; fig. 2. Zoarium very narrow, linear, adnate. Zoœcia in regular transverse series, elongated, quadrate, separated by distinct thickened margins, membrano-calcareous in front, with a large transverse bullate enlargement immediately below the mouth; mouth rounded above, slightly narrowed below, a small mamilliform process on one or both sides.

I have much pleasure in associating Dr. Whittell's name with this elegant species. Its generic position may be somewhat doubtful, but its characters agree on the whole with those of the other species of *Thairopora*, from which it chiefly differs in the large bullate enlargement below the mouth. In the youngest zoœcia this part of the cell is marked off by a fine transverse ridge, between which and the mouth the enlargement becomes developed. It has no communicaiton with the main body of the zoœcium. The transverse arrangement of the zoœcia occurs also in *T. dispar* and *T. Woodsii*. The mouth is placed on a somewhat lower level, and slopes slightly backwards. I have only seen the specimen figured, and an examination of others would be desirable.

FAMILY CRIBRILINIDÆ.

CRIBRILINA, *Gray.*

C. monoceros, Busk. St. Vincent's Gulf.

FAMILY MICROPORELLIDÆ.

ADEONA, *Lamx.*

A. foliacea, Lamx.

A. cellulosa, McG.

A. grisea, Lamx.

ADEONELLOPSIS, *McG.*

A. foliacea, McG. Encounter Bay.

A. Zietzii, n. sp.; fig. 3. Zoarium encrusting. Zoœcia irregularly arranged, ovate, distinct; mouth subcircular with the lower lip hollowed, or semicircular with the lower lip nearly straight; surface tubercular and perforated, usually a large nodular mass below the mouth, and occasionally others similar at the sides; zoœcial pore subcentral, entire, or stellate. Oœcial cells large, surface with large nodosities round the margins, especially above, pores usually two or three, stellate, in a central depression; mouth wide, arched above, straight and projecting forwards below. St. Vincent's Gulf.

The specimens examined surround the stems of a small alga. They are of a leaden grey colour, owing to the presence of a rather thick epitheca. The whole surface is rough with small rounded nodules, among which, when the epitheca is removed by incineration, numerous small rounded foramina are seen, especially along the margin. There is usually a large, glassy nodule between the lower lip and the pore which it frequently overlaps and conceals. Other larger ones are also common to the sides of this and towards the margins of the cells. The pore is small and plain or slightly stellate. The oœcial cells are very large, with numerous large nodules either round the whole margin or confined to the upper part, leaving a central depression in which are one or several stellate pores. The mouth is very wide, not so lofty proportionately as in the others, and has the lower lip straight or slightly convex. In many of the zoœcia at the lower edge of the suboral nodule is a minute avicularium with the point of the mandible directed upwards and the base resting on the pore.

FAMILY ESCHARIDÆ.

SCHIZOPORELLA, *Hincks.*

S. schizostoma, McG. St. Vincent's Gulf.

S. triangula, Hincks. Glenelg; St. Vincent's Gulf. The specimen of this occurs in the Hemeschara-form.

The zoœcia are very irregular in size and shape, confusedly arranged and separated by prominent raised lines. The oœcia are abundant and very characteristic. The lower edge is produced downwards into one or more blunt processes, while a similar, sharper process rises upwards from each side of the zoœcial oral notch.

S. lata, McG.

The specimen of this species occurs as a beautiful branched and astomosing tube, which has evidently been moulded round a sponge, of nearly three inches in greatest extent, the diameter of the tubes being in some parts a quarter of an inch.

S. biturrita, Hincks. Brighton.

PARMULARIA, *Busk.*

P. obliqua, McG. St. Vincent's Gulf.

SMITTIA, *Hincks.*

S. Landsborovii, Busk. Kangaroo Island.

S. trispinosa, Johnston, sp.

The only specimen of this species is bilaminate, and forms a beautiful foliated ribbon-like zoarium extending up and round the narrow stem of a black alga for a distance of about three

inches, the ribbon at its widest part being about half an inch. The orifices of the marginal zoœcia are nearly circular, with a prominent denticle ; in the older the peristome is much produced as in the var. *bimucronata*. The avicularia, when present, are usually large, by one side of the mouth, with the mandible pointed downwards. There are numerous oœcia with large perforations.

MUCRONELLA, *Hincks.*

M. Ellerii, McG. St. Vincent's Gulf.
M. papillifera, McG.

ADEONELLA, *Busk.*

A. platalea, Busk. St. Vincent Gulf.

FAMILY CELLEPORIDÆ.

LEKYTHOPORA, *McG.*

L. hystrix, McG.

CELLEPORA, *Fabricius.*

C. lirata, McG.
C. cidaris, McG.
C. verrucosa, McG.

SCHISMOPORA, *McG.*

S. costata, McG.

FAMILY RETEPORIDÆ.

RETEPORA, *Imperato.*

R. phœnicea, Busk. Kangaroo Island.
R. monilifera, McG., var. *sinuata.*

R. monilifera, form *arcuata.* A specimen occurs differing especially in the oœcium which it is desirable to distinguish. The zoarium, about three and a half inches in longest diameter, forms a tubular and calyculate mass. The fenestræ are oval, narrower than the trabeculæ. The peristome of the zoœcia is produced with a loop-shaped notch, on one side of which is a rounded avicularium. There are also frequent elliptical avicularia on the front of the zoœcia, and horizontal avicularia on the inner edge of the lower part of the fenestræ. The oœcia have an arched or angled beaded line or stigma without vertical extension. The posterior surface is faintly vitricate and granular, with small elliptical avicularia, especially towards the margin of the fenestræ.

I am not satisfied that the forms I have described as *munita* and *umbonata* should not rather be considered as species, in which case this would take similar rank.

SUBORDER II.—CYCLOSTOMATA, *Busk.*

FAMILY CRISIIDÆ.

CRISIA, *Lamx.*

C. acropora, Busk. St. Vincent's Gulf.

FAMILY IDMONEIDÆ.

IDMONEA, *Lamx.*

I. radians, Milne Edwards.

I. Milneana, d'Orbigny.

SUBORDER III.—CTENOSTOMATA, *Busk.*

FAMILY VESICULARIIDÆ.

AMATHIA, *Lamx.*

A. australis, Tenison Woods.

A. pinnata, Kirkpatrick.

A. distans, Busk. Of this I have examined two small specimens, not very perfect, but still sufficient to show their identity with the form described from off Bahia in the Challenger Polyzoa. It is readily distinguished from our other Australian species by the series of zoœcia describing a single—sometimes not quite complete—spiral round the upper half of the internodes.

VESICULARIA, *J. V. Thomson.*

V. bilateralis, n. sp.; fig. 4. Zoarium cylindrical, confervoid, branched, articulated, each internode giving origin to three arranged in a verticillate manner. Zoœcia disposed in two thickly clustered series on opposite sides of the branches, occupying the whole length except for a short distance at the base; ovate, length 0·4 mm., diameter about 0·25 mm.

The only specimen I have seen is probably a fragment of a larger mass.

EXPLANATION OF FIGURES.

Figs. 1 and 1*a*. *Menipea Porteri*, front view, magnified. Fig. 1*b*. Posterior view of same.

Fig. 2. *Thairopora Whittelli*, natural size. Fig. 2*a*. Two young zoœcia near the growing end, highly magnified. Fig. 2*b*. Two series farther back, showing fully-formed zoœcia.

Fig. 3. *Adeonellopsis Zeitzii*, two zoœcia, magnified. Fig. 3*a*. Small portion magnified, showing zoœcia and oœcial cell.

Fig. 4. *Vesicularia bilateralis*, natural size.

On the Geological Structure and Physical Features of Central Australia.

By J. J. East, Corresponding Member.

[Read April 2, 1889.]

Plate III.

TOPOGRAPHY.

In following the Overland Telegraph Line northward from the Flinders to the Macdonnell Ranges, the route traverses the Lake Eyre basin, and ascends a gentle slope to an elevated region in the heart of the continent.

Three principal divisions of country present themselves along the route, and may be termed—

I. "The Great Austral Plain."—A vast region of inconsiderable elevation, with some portions especially low-lying, and descending at the surface of Lake Eyre to about 20 feet below sea level.

II. "The Terraces." — The slopes and low parallel ranges which border the plain and form, as it were, a flanking terraced formation to

III. "The Great Central Plateau," whose furrowed southern face develops the system of narrow ridges collectively known as the Macdonnell Ranges.

Within the first division, and west of Lake Eyre, stands the Denison or Peake Ranges. They rise like islands from out of a plain of sands and clays, and are outlying portions of the Flinders Range.

I. The Great Austral Plain.

The surface contour is a level plain, with the horizon in every direction more or less broken by low flat-topped hills of uniform height, shaped like truncated cones, or else a low precipitous bluff, uniform in height with the cones, and forming the escarpment of a small "tableland" a few miles in area.

The hills and bluffs are almost destitute of vegetation. The arborescent growth is limited to acacia bushes, a stunted Eucalypt locally termed the "Box" or "Coolibah," and the crooked "Gidgia," a wonderful specimen of vegetable contortion; whilst on the plain, trees are rarely seen, but the hardy saltbush and cotton-bush abound for miles. Large patches of the level plains near the hills are perfectly sterile, and are covered with a

layer of smooth, glazed, rounded or subangular stones, set so closely together that the appearance is not unlike a pavement. The bare patches, or "gibbers," alternate with less stony or sandy areas and small shallow depressions, termed *claypans*. Where the stones are absent the saltbush abounds, and on the sand a few small bushes maintain a precarious footing; but the claypan is smooth and bare, the edges usually margined with a growth of samphire, and the surface white with a coat of salt-efflorescence.

The southern portion of this region presents its most extreme character, and is met with immediately after leaving the north termination of the Flinders Range.

As might be expected, this basin being the receptacle of a vast drainage area, there are some immense watercourses, which conduct the occasional flood waters to the lowest levels; but so gentle is the slope, and so local and irregular is the rainfall, that it is not an uncommon circumstance for the lower portions of the channels to be destitute of running water for years together. In fact, throughout the great plain a mild drought may be considered its normal condition; but heavy rains around its edges may send down a flood exceeding the capacity of the lower channels. Then the country becomes inundated for miles on either side; billabongs, saltpans and all depressed portions are filled to the brim, and the non-absorbent character of the clayey soil permits these waters to remain for long periods—perhaps till another flood—and furnish the only supplies of surface waters that man and beast can obtain.

After such an inundation the aspect of the country undergoes a complete and wonderful transformation. The dreary monotonous waste, which formerly only reflected the heated rays of the sun and the landscape of mirage and uncertain outline ever varying amid the air currents,—the very sight of which intensified the arduous nature of the traveller's journey, and begat an involuntary sense of fear and shrinking,—is succeeded by a magic growth of beautiful green sward, from out of which rise "geraniums," "parakylia" and succulent herbs delightful to animals and gratifying to man.

It is but for a short time, however, that the desert thus "blossoms as the rose." The great heat following after moisture induces a rapid growth, but only of ephemeral existence; and after a bush fire, or the more slow wasting due to natural causes, the country relapses into its normal condition.

The foregoing is especially true of the country east of Lake Eyre, where the Barcoo or Cooper's Creek brings down the storm waters of the Queensland coast range. From the slopes near Carpentaria, in the north, the flood waters follow the ill-defined channels of the Diamantina and Mulligan, while from the slopes

of the west and north-west, which reach to the summits of the Musgrave and Macdonnell Ranges, the waters come down the deeper channels of the Neales, Macumba, and Finke. Seldom, however, do the waters of those last-mentioned three creeks run right through to the lake. Their channels contain so much sand that the flood is absorbed before it has completed half the length of its course.

In fact, with regard to the longest and most important of these creeks—the Finke—it is extremely doubtful whether its waters ever reach the lake, but are not rather absorbed by the interminable waste of sandhills which lie along the west side of the Queensland border.

In the region lying south and south-west of the lake, the creeks are short and situated throughout their length in a country of exceptionally small rainfall, consequently this portion of the great plain presents the most arid and least-inviting part of its surface. This region would be altogether impassable to travelling stock, if storm waters were the only supplies obtainable, but at intervals forming easy stages the beds of clay of the plain yields to the pressure of waters beneath ; and so at numberless points, the sites whereof are indicated by a low limestone mound, there is an oozing out of water sufficient and unfailing for the requirements of stock, but insufficient to create a running rill extending beyond the base of the mound. There it is either absorbed almost immediately, or a small reed-fringed pool may be formed, according to local circumstances or the amount of water issuing forth.

The belt of country containing these springs reaches from Hergott Springs all round the south and west sides of the lake. They become less numerous and more isolated as the distance increases westward or north. Dalhousie Springs is an outlying system to the northward, and is situated on the edge of the sandhill country in which the Finke loses itself.

All the country in which the springs occur has nearly the same relative level and, excepting the actual surface of Lake Eyre, is the lowest portion of the great plain.

Leaving the Spring Country and ascending the watercourses, the table-topped hills become more numerous and outlie more extensive areas of tableland. The plains or level parts are not so extensive, and the sandhills are a prominent feature only along the main valley bordering the channel. Patches of scrub, principally composed of mulga *(Acacia aneura)*, with occasional Casuarina (desert oak) and Eremophila, make their appearance. At first alternating with open grassy plots, the scrub gradually becomes more and more the prevailing feature as the limits of this first division of country is reached. Still higher up the creeks, their channels become deeper and more like gorges cut into the

tableland, whose surface is either stony or sandy, and whose edge is terminated by a bluff escarpment over-looking the lower plains, dotted with outlying detached flat-topped hills and patches of formerly-connected tableland.

II. The Terraces.

The second division of the county commences about eighty miles south of the Macdonnell Ranges, and consists of a number of parallel ranges of low altitude separated by broad valleys or plains. Each range and plain to the northward being higher than its neighbour to the south, their general aspect is that of a series of terraces constantly rising with a gentle and imperceptible slope to the foot of the great plateau whose southern edge forms the ridges collectively known as the Macdonnell Ranges.

The two great creeks, the Hugh and the Finke, which rise in the Macdonnells, run southward over this system of terraces and junction just on the edge of the Great Plain. Each has a channel as broad as the Murray at Morgan, and throughout their length the beds are filled with clean white sand as fine as that of the sea-shore. Large gum trees grow thickly on either side leaving only the mid-channel clear.

Such is the character of the numerous watercourses, which are marked on the maps as rivers, but whose real character is disguised under an equivocal name compounded of its patronymic and the definite article only. Thus we have not the *River* Finke, *River* Goyder, &c., but *The* Finke, *The* Goyder, *The* Macumba, &c., concerning which the observer must use his own intuitive perception as to whether it is a river, nullah, or gorge.

Water, whose presence might reasonably be expected on account of the vigorous tree-growth, is readily obtainable by sinking in the sand, while at a few localities local circumstances cause the water to appear at the surface, where its presence is immediately betrayed by a growth of rushes.

Explorers' routes were, of course, along these creeks, and the trade route naturally keeps in the same track.

The Ranges, as a rule, are densely wooded from base to summit by Mulga-scrub, except in those situations where bare rock or a cliff face renders vegetation impossible. A fig-tree is met with; and in the Finke channel below the Macdonnells, a glen is so productive of a *Livistona* that it has been named the "Glen of Palms." The plains between the ranges are mostly covered with mulga-scrub, comprising besides mulga, sheoak, myall, Grevillea, Hakea, and a peculiar looking Eucalypt *(E. gamophylla)*, locally termed "apple tree." The soil is usually a sandy loam, fairly grassed, but where open spaces of

sandhills occur the sands are bound together by the odious spinifex *(Triodia irritans)*, which grows in tufts about two feet in diameter.

This system of parallel ranges borders the Macdonnells on the south side throughout their whole extent. The drainage is to Lake Eyre, except the extreme western portion, which trends towards Lake Amadeus, another basin analogous to Lake Eyre, but at a higher level, being about 600 feet above the sea. The slope of which this division is formed may be considered to range from about 1,000 feet above sea at its lower edge to about 2,000 feet at its upper limit where it abuts on the Macdonnell Ranges.

III. The Central Plateau.

This plateau, of which the Macdonnell Ranges forms the southern face, is of a triangular shape, as far as its limits are at present known. The apex terminates between Alice Springs and the Queensland boundary, but towards the base it extends into regions still unexplored. Its mean altitude verges close on 3,000 feet, and the highest points are along the Reynolds and Strangways Ranges to the northward of the Macdonnell system, Mount Gardiner, in the former range, rising over 1,100 feet above the plain at foot, as determined by Mr. W. C. Gosse. The Reynolds Range, prolonged through the Strangways and Hart Ranges, has a general direction of E.S.E., while that of the Macdonnells being nearly east and west, a convergence of the two systems takes place in that section termed the Hart Ranges. The creeks originating in the Macdonnells, except those near the western end, run down into the Lake Eyre basin. The western drainage is towards Lake Amadeus, and it is probable were the supply of running water sufficient a large creek would traverse the whole length of the elevated plain between the Macdonnells and Reynolds Range and rounding the Macdonnell's western end fall into the Amadeus basin. North of the Reynolds Range the Lander, Hanson and Woodforde Creeks lose themselves on the plateau, but more eastward still the creeks originating on the north slopes of the Strangways and Hart Ranges being united into two large channels—the Sandover and Plenty—after a short northern course turn eastward, and rounding the apex of the plateau, enter the long sandy trough descending to Lake Eyre, and in which the main line of drainage is termed the Marshall River. This trough is a most desolate region of sand and spinifex, and appears to swallow up all the waters brought down by the Finke, Todd, Elder, Illogwa, Plenty and Sandover Creeks, which drain two sides of the great plateau. The tropic of Capricorn passes over the plateau just north of the Macdonnell ridges, and as might be expected of a region thus elevated under the

tropic, but in the heart of the continent, the climate partakes of the extremes of moist heat and cold dryness. The moisture is brought by the monsoon winds, which follow the sun down from the north coast, but the intense cold is due entirely to radiation under a clear sky after the monsoon has abated. At the head of the Hale River on the 11th September the thermometer ranged from 85° F. during the day to 19° F., or 13° below freezing, during the night. No snow or hoarfrost ever accompanies this cold, because there is not sufficient condensable moisture present in the air. Humidity follows on the great heat, and then is precipitated in torrents of rain, accompanied by electrical disturbances.

Vegetation of special nature only could withstand such climatic vicissitudes, and for this reason the perennial plants are few in species, though individually numerous and identical with those found in the terraced ranges to the southward.

The rainfall of the plateau, expressed in terms of mean annual average, is not suggestive in itself of aridity or drought, but when it is considered that this rainfall, though amounting to from 15 to 20 inches, falls in torrential showers of short duration, while the normal climatic conditions are those of excessive evaporation, it is immediately evident that the country's surface cannot partake of that moist condition essential to the continued growth of herbage. Beyond this also is the occurrence of long intervals without rain, when the only surface waters are those of some rock hole in a gorge whose precipitous sides shut out the sun's rays, or a hollow scooped in the creek sands by an eddy due to a projecting ledge of rock, marking the position of a rocky bar across the channel.

The creeks on the plateau are short and shallow, and at a few miles from the ridge, which gave them birth, they become lost by spreading over the level country. The plateau is a most arduous stage for travellers. Three times did Stuart essay to cross it before he succeeded, and still later Warburton and his party striking westward, fleeing as it were for their lives, succeeded in crossing it, possessed indeed of their lives, but destitute of almost every other thing with which they started. To the westward the scrubs give way to sand and spinifex to within the West Australian borders, but the north-west limit of scrub which turned back Stuart is unknown. Descending the eastern slope of the plateau, at no great distance from the telegraph line the traveller is again on the great Austral plain, so called first by Favenc, who crossed it from the coast range of Queensland through its full width to the plateau on which runs the telegraph line. The great plain there is a smiling country now rapidly becoming covered with cattle stations. The portions lying within South Australian territory is well known to the commercial world as the Herbert

River country, and is frequently said to be one of the best pastoral regions in Australia.

GEOLOGICAL STRUCTURE.

Outliers of the Flinders Range.

Soon after leaving Beltana in journeying northwards, the Flinders Range begins to break up, and except for the prolongation of the main chain towards Blanchewater and a less important spur towards Mount Nor' West, the primary rocks of which they are formed are lost beneath the gypseous clay formation of the Great Plain. Passing round the south and west sides of Lake Eyre, and ascending as high as the Neales River Valley, five outcroppings of granite and metamorphic rocks are met with. By their strike, sequence and composition, as well as their actual location, there is little reason to doubt but that they belong to the same system as the rocks forming the Flinders chain. The outcrops are :—

1. Finniss Springs.
2. Mount Margaret.
3. Peake.
4. Algebuckinna.
5. Mount Dutton.

Each of the localities are on a line, which, while running northward, recedes also to the west, so that the general direction of a line connecting them would be N.W. and S.E.

1. Finniss Springs.—At this locality a ridge of quartzite forms a low continuation of the Mount Nor' West Range prolonged through Hermit Hill. It forms good building stone, and from it the culverts and railway buildings along the line have been constructed.

2 and 3. Mount Margaret and Peake Ranges.—The outcrops at Mount Margaret and the Peake form the basal portions of the Denison Range, which runs from Anna Creek Station to Mount Kingston North, a few miles north of the Peake Telegraph Station. This range is of irregular outline, and composed of two very distinct systems of rocks. The uppermost series is a friable, white, sometimes chalky-looking, sandstone of considerable thickness, the upper portion being the most compact. Under it is a stratum of ferruginous cement, at times enclosing fragments of white and opaline quartz, at others being built up of ironstone nodules several inches in diameter, but which are simply crusts filled with white siliceous sand in a minute state of subdivision. This band of cement is but from a few inches to about five feet in thickness, and in turn rests on sandy argillaceous beds which graduate into a brittle blue clay weathering to olive-green in

colour. The whole series is horizontally stratified, and covers the primary rocks of the ranges to an altitude of about 400 feet above the sea. From about three-fourths of the eastern side of the range the country has been denuded deeply into the clay bed, which constitutes the plain extending to Lake Eyre. A remnant of the horizontal beds in places still clings to the face of the range, and a few flat-topped hills in the plain attest the depth of eroded strata. From Anna Creek to the Douglas the lower rocks are occasionally exposed by the almost complete removal of the sandstone and ironstone beds, but at Davenport Creek a sudden uprising of the strata takes place and culminates in the summit called Mount Margaret. This upraised ridge and the mount itself rise clear above the horizontal beds which fringe them. From Anna Creek to the Douglas the formation consisted of quartzite (very dense), sandstones and slates, the whole traversed by dykes of white felspar. Thin covering patches of the flat bedded sandstone and ironstone occupy the hollows between the undulations. The ranges are almost bare of vegetation, and standing on one of the peaks nearly east of Mount Margaret I could distinctly make out the strike and dip of the lower beds and their relation to the horizontal ones of the table lands. Mount Margaret is near the centre of an area of great dislocation and faulting. The southern ridge rises steeply from the eastward, and up its face of 200 feet I counted thirteen beds of brown, fine-grained, or compact quartzite intercalated with beds of talcose or mica-slate. The whole series dipping west at an angle of about 50 deg. The creeks which originate north of Mount Margaret run out eastward through gorges which give good natural sections and show the lowest bed to be a thick bed of conglomerate, formed of boulders of hornblendic, chloritic and micaceous schist cemented together by lime. In the cliff sections numerous caverns are seen, some large enough to contain three or four horsemen. They seemed caused by the dislodging of a nest of boulders by water filtering out from the sides of the gorge. Chloritic and talcose schists lie above this bed, and are succeeded in turn by the brown quartzites and talcose slates as displayed in the southern spur. Numerous dykes of granite containing very little mica or quartz seem to have been the first disturber of the strata, while a second disturbance was afterwards caused by extensive eruptions of syenite frequently so quartzose as to be termed a quartz-syenite. This quartz-syenite forms low hills about seven miles out on the plain north-east of Mount Margaret, at the base of which are some springs rising through the clay, whence the hill is termed Spring Hill. North of Mount Margaret the swelling, of which it is the culminating summit, again sinks down to the

level of the ironstone table-land and continues to Mount Denison in the Peake system of rocks. The metamorphic rocks of this system have the form of an arrow with its point to the southward. The Mount Kingston ridge represents the shaft while the quartzite ridge from Coppertop Hill to Mount Denison and thence north-west again to Peake Creek represents the barbs. Quartzite of reddish white colour, massive and compact, is the highest member of the series here. Under it are argillaceous, chloritic, micaceous and hornblendic schists, with bands of crystalline limestone which weather black on the surfaces, revealing small fragments of schist incorporated with it. Numerous outcrops of a coarse red granite with large felspar crystals intersect the strata, which have a most confused strike and dip, due to the granitic and syenitic eruptions which have taken place. South of the Telegraph Station the granite contains white mica and tourmaline in fair-sized black crystals. A sectional line across the ranges from Peake Telegraph Station shows three ridges, the first granite and schist, the second syenite of grey colour and schist, and the third of quartzites and talcose slates in thin bands, as seen forming the highest beds at Mount Margaret. Dykes of diorite of small dimensions traverse the schists and small veins of quartz containing oxide of copper and secondary formations of atacamite are common, but I saw nothing worth following up as a probable continuous metallic vein except the exposure to the west of the Telegraph Station. The sectional drawings will best convey the relative sequence of the rocks forming the ranges and the table-land deposits which occur in their hollows or on the flanks of the range. The line of the Peake Creek as it comes through the range is evidently that of a great fault, wherein the range and its granite core have been disturbed by subsequent forces. On the middle ridge, west of the Peake Station, are some fragments of schistose rocks forming a breccia-capping to the hill. The fragments are angular and evidently not waterworn to any very appreciable extent.

4. Algebuckinna. — Where the telegraph line crosses the Neales River schists are seen, traversed by granite and quartz-syenite-dykes; in the schists are pale garnets of small size, and some strings of rich copper ore similar to that at Peake; large reefs of magnetic iron accompany the syenite. The channel of the creek has an exposure of metamorphic rocks, &c., for about two and a half miles in length. The banks of the channel are about 90 feet high, and about one mile apart. The sectional drawing shows the bank to be composed of impure kaolin resting directly on the metamorphic series, having overlying beds of coarse and fine gravel, with thin clay partings, and the whole capped by a six to 12 feet stratum of very hard, coarse-grained,

brown sandstone, which breaks with a sharp cutting edge. In solution of potash it becomes friable after long digestion. This place is known as Algebuckinna goldfield, and was first discovered during the telegraph construction, but the discovery was not disclosed to the public till about two years ago. The actual channel of the river is filled with a drift of alluvium about 18 feet deep where deepest sinkings have been made, but the locality being one of those few places where waterholes occur, the influx of water prevents full exploration. The gold of this recent alluvium is apparently derived from the coarse gravel stratum overlying the kaolin, as gold is found in it, and the richest finds have been made in the talus immediately under it. The gold is very pure, and brought £4 per ounce at the Melbourne Mint. In appearance it is sharp, and the presence of crystals of black ironstone embraced among its projecting parts proves conclusively that it has not travelled far. About three miles up stream is the Ockendon Creek, which junctions here over gneissoid schists, among which are quartz leaders carrying pyrites ; and possibly it is from this locality that the gold has been derived, although I could not detect gold in the quartz I examined. Ten miles north-west of Algebuckinna is the

5. Mount Dutton Range, which lies about ten miles north-west of Algebuckinna, I did not visit; but as our route passed within two miles of its northern end, I was enabled to distinguish a succession of beds in appearance like those of the Denison quartzites and slates.

This was the last exposure of metamorphic rocks for the next 350 miles, and the conclusions warranted from the examination of their series are the following:—

1. They are probably outlying portions of the Flinders Range, as their rocks agree in strike, sequence, and mineral composition with that portion nearest the plains.

2. They are probably a chain of archæan islands which occupied a shallow sea, as evidenced by the conglomerate beds or breccias, the thick beds of quartzites, and continuous bands of limestone, in which schistose fragments are imbedded (though only perceptible when weathered).

3. After deposition of the schists, granitic eruptions raised the beds into ridges running nearly north and south.

4. Great erosion took place before the second period of eruptive rocks were intruded, and their action faulted, dislocated and greatly contorted the whole system; and as the mineral deposits are always in their vicinity, they were probably the mineralising agents of the system.

5. After another long period of erosion, during which the ranges received in great measure their present contour, a period

of depression followed, during which the table-land formation of clays were deposited on all points except the actual crests of the range.

6. Another uprising ensued, since which the table-land deposits have been continually undergoing removal, and now only portions remain flanking the range. Of this the eastern side, being on the side of quickest drainage, has almost disappeared, while the western side is still sufficiently continuous to form a great proportion of the range.

The Great Austral Plain.

We have already some knowledge of portions of the great plain through the geological observations made by the geologists of the the adjoining colonies near our boundary line, and public works undertaken by our own Government along the shores of Lake Eyre.

Long previous to the official statements recognising the Mesozoic age of the Lake borders, Professor Tate, then President of this Society, had critically examined all available data connected with the region, and declared positively in his anniversary address that a large Mesozoic formation, probably of Jurassic age, occupied a large part, if not the whole, of the Lake Eyre basin. Since then the deep bores of the Water Conservation Department and the continued collection of fossil evidence from various localities have changed the presumptive into positive, and we now know that the Tertiary and Cretaceous formations which extend west of the East Coast Range not only cross our boundary from the eastern colonies, but there is good reason to believe that in the latitude of Lake Eyre, at least, they extend right across our whole province. The furthest westward from which fossils have been obtained from this formation is on the Arkaringa Creek, about 70 miles west of the Peake, from which place a splendidly preserved portion of a cast of the *Crioceras australe* was procured by my brother (Mr. W. H. East), and through me presented to the museum of the Adelaide University, where it now is. Curiously enough, the only other specimen yet discovered is from the Flinders River, in Queensland, on the counter slope of the great plain, where its drainage turns towards the Gulf of Carpentaria. Fossils identical with those occurring at Mount Margaret were obtained by me from Dalhousie Springs; and at Mount Daniel, about 18 miles north of Charlotte Waters, I obtained *Lingula subovalis* and a piece of silicified coniferous timber which had been drilled by Xylophagas. A most remarkable feature throughout the whole region is the remarkable uniformity of the beds both in sequence and composition, This is well illustrated in the sections

of different localities naturally displayed, and in a manner most unmistakable.

The flat-topped hills and tablelands, which without seeming method or system occur throughout the whole of the Cretaceous basin now under discussion, are but remnants of the one vast deposit, now in part removed, but of the nature of which their faces are the typical sections.

The lowest stratum disclosed is a bed of blue clay, greenish when weathered, and more or less sandy in its upper portion. It lies horizontally, or nearly so; the clay is brittle and very retentive of water, and at considerable depths in it are thin seams of limestone made up of shells and casts, which are so brittle that an attempt to extract any probably results in destroying the specimen. Spheroidal masses of argillaceous limestone up to two feet in diameter are frequent; they do not contain any fossil remains, and are usually coated with a thin layer of gypsum. In fracture they break into perfect segments, proving the homogeneity of their structure, and that the form is not due to abrasion. The colour is "dark stone," but in thin edges of a translucent "honey colour." Gypsum is abundant in thin plates; it is to be remarked that I seldom met with it among the fossils, or rather the fossils seem to be situated down in the clay beds *below* that portion in which the gypsum is developed.

Above the blue clay is a stratum of argillaceous ironstone in form of nodules, concretions and thin sheets. It varies in thickness from a few inches up to ten or twelve feet, and seems to have been formed in fine sand, for most of the nodules are simply cases filled with white sand. On exposed places these nodules by weathering permit the escape of the sand, and then the aspect of the deposit is that of scoria from a huge smelting furnace. Near the Peake Range, this belt of ironstone is charged with fragments of semi-opal and quartz, and might fairly be termed a conglomerate rock. The quartz is evidently derived from the veins among the schists, forming the mass of the ranges, and is coarser the nearer the ranges are approached.

Above the ironstone band is a stratum upwards of 200 feet thick of a friable white sandstone composed of clear white grains of sand cemented together with an argillaceous paste. At times the paste is in excess, and then the faces of the hills and bluffs have a white chalky appearance, and sometimes, though rarely, contain gypsum in the portions near the ironstone band. Towards the top the grit becomes more compacted by infiltrated silica, and the top is composed essentially of a capping of porcelainised sandstone from one to six feet in thickness; in fracture it is evidently a sandstone, and the weathered surface has always a glazed appearance and superficial staining by oxide of iron.

When this capping surmounts a portion which is more argillaceous, the siliceous hardening and glazing gives it the appearance of baked earthenware. Veins of chalcedony are common among the planes of shrinkage, and nests of the same material furnish the so-called flint fragments which are so common throughout the region. This chalcedony varies from pure translucent specimens to the porcelainised sandstone just referred to, and it is easy to select pieces showing the different stages of transition.

This gritty bed represents the surface of the country before it was exposed to the erosive action of running water, and the height of the flat-topped hills attest the depth to which the creeks and wind have changed the contour of the country. From Charlotte Waters to Lake Eyre the erosion has extended down through the grits and for some distance into the blue clay, being deepest in the latter bed as Lake Eyre is approached. As a consequence the nearer the lake the greater is the exposed or uncovered surface of the clay through removal of the grits; the only vestiges of which now are the porcelain stones and ironstone nodules which constitute the "gibbers" or stony patches referred to previously as forming a feature of the surface of the great plain. Along the railway line at present constructing the only stone available for ballast are the gibbers, and but for their existence ballast would require to be brought from places beyond the plain. As it is they are cheaply and expeditiously raked together and wheeled on to the embankment.

This continuous bed of clay, whose surface is below sea level at Lake Eyre, abuts directly against the ancient rocks which form the Flinders Range and their extension north-westerly to the Peake and Mount Dutton, which thus forms the southern edge of the basin which encloses them. Northwards the clay-bed extends into regions where the rainfall is considerable and the ground more elevated, but over which water seldom runs at the surface. At whatever point, therefore, the lower side of this bed is brought near the surface of the ground, opportunity is afforded for waters to percolate below. This water having percolated to the limits of the basin, where it is bounded by impervious beds of older rock but little jointed, must necessarily remain pent under considerable hydrostatic pressure, which at length overcoming resistance, forces a way up through the clay in the neighbourhood of its abutment against the old walls. Lime is deposited around the mouth of the orifice as soon as the water comes to the surface, and the pressure eased. In this manner a mound is built up of travertine, which increases in dimension until the hydrostatic pressure is compensated, or, what is still more probable, until the orifice is closed by continual deposition along its sides, and then another spring breaks out at a lower level.

Iron is frequently present in the waters, and being also deposited in presence of decaying vegetation which accumulates at the spring among the crevices of the calcareous tuft, it has assumed a yellow ochre appearance not unlike powdered sulphur, for which, indeed, it was taken to be at a time when the origin of these springs was supposed to be volcanic.*

The temperature of the waters is variable in different localities, that of the three springs at Dalhousie Station was 73°, 79°, and 93° F., but I was informed that the largest one some miles northward was quite as hot as the hand could bear without suffering, though, like those at the station, perfectly palatable and tasteless.

The fact of the creek channels having cut down to the bed of retentive clay is the cause of many of them having large though not deep waterholes. Such an one is Algebuckinna ; the Angle Pole waterhole is another ; the Ross at Macumba and the holes at Charlotte Waters are other instances; and as a general premise it may be said that the deeper down in the bed the less sand, and consequently better holding ground obtains.

At Mount Daniel the sandy clay in which fossils occur is a yellowish one, speckled green with what is probably glauconite grains. The shells and wood are silicified, and jointing planes or shrinkage cracks are already coated with a thin film of porcelain. The channel of the Goyder separates this hill from Mount Townsend, which stands on the bank of the Finke, and displays well the usual section.

After leaving Mount Daniel and ascending the Finke channel the upper bed or sand grit gets thicker. The Finke being the main drain of this region should yield the best cliff sections. About a mile above Crown Point cattle station is Cunningham's Gorge. In this same grit and immediately above this gorge, the channel is strewn with large boulders of red granite, well rounded, and also some masses of a porcelain breccia, enclosing argillaceous schist fragments of several inches extent. No bed rocks are exposed in the channel, which seemed to be all of argillaceous beds surmounted by cliffs of porcelain-capped grits, and I looked in vain for some break in the country indicating a change of formation. As some of the boulders weigh about a quarter of a ton they cannot have been washed from any great distance, and I think most probably a bar of primary rocks representing an ancient ridge here comes up to the surface, but has now been eroded away or covered by the sandhills which obtain for the next 20 miles to the northward. This seems probable, because at 18 miles higher up stream the cliff section reveals a

* This substance was examined in the University laboratory by Mr. A. W. Fletcher, and found to be persulphate of iron. On ignition it gave off a slight odour of burnt organic matter.—EDITOR.

ridge of argillaceous and hornblendic schists, having a central core of red granite, crossing the county in an E.N.E. direction, but which is covered by at least 70 feet of wind-drifted sandhills. Approaching this exposure the cliff banks are clays and sand-grits, very micaceous, and abounding in gypsum slabs. The flat-topped hills stand back some distance from the channel, as shown in the sketch. Rolled granite boulders occur on top of the dyke and on the schist below, evidently having been worn by water. The channel is over a quarter-mile wide, and the depth from top of the sandhill to surface of the sand in the creek is about 125 feet by aneroid. The clay bed rests against the schist almost horizontally on either side, and on the up-stream side the water is impounded by the bar of schist, and is the cause of the small holes called Polly's Springs. There is so much salt in the clay, however, that it contaminates the water and renders it almost undrinkable and highly purgative. In the lower part of the schist or near the granite dyke a thin band of argillaceous schist is completely impregnated with almost microscopic specks of green copper ore. An assay of the rock by the Government assayer gave about ·18 of a per cent. of copper. The upper portions of the schist are argillaceous and intercalated with narrow bands of brown quartzite, similar to that in the higher beds of the Denison Range at Mount Margaret.

Thirty miles N.W. of this dyke, over loamy plains dotted with porcelain-capped hills, lead to the bank of the Finke, overlooking old Idracowna station. The cliff banks are of white grit, and from the north side they are surmounted for ten miles by a veritable sea of steep spinifex-covered sandhills. These abut against and surround a remnant of tableland, which has by sub-aerial influences been cut up into narrow sections of grotesque shape and singular aspect. One of them, which Stuart names Chambers' Pillar, stands on a pedestal of conical outline, composed of thin layers of friable greenish-white sandstone. The pillar is more argillaceous, and the summit for about six feet in depth is stained red by iron, and judging by fragments which are found below, is superficially glazed.

The two points on the pillar, which in Stuart's description are prominent objects, have in the course of 30 years been weathered to nearly the one level, wherein also the protective influence of the capping portion is attested by the dimensions of the pillar at the summit exceeding its middle girth. Around the north view the broken and detached hills are weathered into castellated shapes.

Hitherto no section has disclosed what underlies the blue clay bed, but at 14 miles north of the pillar the second division of country begins at Mount Charlotte ridge, the most southerly of the terraced formation.

II. The Terraces.

The Mount Charlotte ridge (fig. 5) consists of a purple fissile sandstone which rises about 200 feet above the sandy tract, which separates it from the Pillar and its neighbours fourteen miles to the south. The dip of the series being south at only 20 deg., but very precipitous on the north side and bare of vegetation; a good natural section is displayed about two miles east of the track. At the foot of the escarpment, the sandstone is underlain by a bed of argillaceous limestone arranged in mammillary concretions, the concretionary layers having manganese-dendrites between them, and what might be termed the nucleus of the concretion is singularly like the cast of a shallow shell.

Beneath this band is another close-grained argillaceous limestone, which leaves an insoluble residuum of quite one-third when treated with hydrochloric acid. Portions of this band have a minute oolitic structure so suggestive of foraminifera that it was only after Mr. W. Howchin, F.G.S., had made a microscopic section that it was settled they were not organic. Next following underneath is a thick stratum of calcareous sandy or earthy nature, very fissile and soft, and containing an immense number of thin veins of manganese and manganic ironstone. From this stratum, which weathers easily, the numerous nodules of manganese and ironstone, which covers large areas, is derived.

The lowest bed of all is a siliceous limestone, which weathers into a corrugated face like a very coarse file, and by its weathering exposes angular fragments imbedded in it, which are undistinguishable from the porcelain cap of the table-land.

This series, which in gentle undulations forms the terraces and parallel ridges, intervenes the whole distance to the foot of the Macdonnells. At Mount Burrell Station, a few miles further north, is the Whinham Springs of Stuart. The springs are due to an anticlinal fold which here crosses the Hugh. Just below the springs, the limestone exposed in the cliff dips south at 45 deg.; and immediately northward and continuing for many miles, the dip is north at a very low angle. This brings the different beds in view as an ascending series so far as the James Range, where a synclinal trough is well marked, and a well 190 feet deep pierced the fissile sandstone (which is here of white colour) and struck good water. North-west of Mount Burrell, the porcelain capping is seen on the eminences, but the aspect is not so prominent as on the grits of the table-land. It is evident, however, that the porcelainising action extended over the whole surface of the country, but of this more hereafter.

In the Waterhouse Range, a very clear synclinal trough is

seen in the banks of the Hugh between Owen Springs Station and the Undertree Well.

The sandy covering of the plains between the ranges conceals the rock formation below, and the flat-topped hills which occur in some portions of them were away from the track and therefore I was unable, through the exigencies of travel, to do more than surmise their probable structure.

III. The Central Plateau.

Seen first from the Waterhouse Range at Orraminna Pass, thirty miles away, the aspect of the Macdonnell Range forming the south edge of the plateau is anything but imposing. The narrow gaps in the range show no sign of other ridges beyond, and this one ridge can be plainly discerned by its overhanging scarped edge facing the north, and its foot sloping into the plain, to be an immense layer of rock which has been tilted up on edge.

This ridge is composed of an intensely hard red quartzite in layers of about six inches thick, but the layers have little or no cross jointing. It strikes nearly east and west, and rests directly on a very felspathic mica schist in which are bands of granite of coarse texture. Above the quartzite is a thick stratum of limestone, very impure and variable in composition. It may be best described as an immense number of thin bands of argillaceous and siliceous limestones with partings of argillaceous sandy matter often intermixed with seams of brown ironstone, and the whole mass pervaded by manganese dendrites.

At the gaps, which are about two chains wide, the different creeks which rise further to the north flow out on to the plain, and during rains form an extensive area of flooded ground, which is eventually drained by the Todd Creek. The gaps, commencing with the western one through which the telegraph line passes, are Temple Bar, Heavitree, Emily, Jessie, and the Slip-panel—the latter, as its name suggests, being so narrow as to be closed to cattle by a panel or so of fencing. Where the gaps open on to the plain the limestone is worn back for some considerable distance on either side, and the plain is strewn with stones of quartzite, porcelain and chalcedony. Between the gaps, however, the limestone foots the quartzite in the form of black-looking knolls, whose colour is due on its weathered faces to a superficial coating of manganese. The knolls of limestone reach, perhaps, 100 feet up the slope of the quartzite, and are covered with mulga. Above this the quartzite stands up three, four, and 500 feet red and naked, except where here and there a cycad maintains a footing among narrow crevices in the rocks. The summit is a narrow ridge, and the north side is a sheer precipice or steep escarpment caused by the breaking away of the undermined rock

to about half the depth of the side, and there the schists buttress it up, having their own slope covered with a talus formed of the fallen quartzite rocks. Standing on the ridge, the quartzite can be traced for miles to the limit of vision on either side. Varying little in apparent height, sometimes straight, sometimes sinuous, this thin red line holds its own in a general direction of east and west. Distinctly visible from this elevated position, the mass of upland country collectively termed the Macdonnells are seen to be composed of other ridges, all parallel and narrow, and inclined like the first. The rock tints and scarped edges leave no room for doubt as to their identical composition, and that they are situated along the edges of a line of faults which bring the same series and sequence of rock beds into view. Looking northward the country rises, and the quartzite ridges are but little elevated above the plain which extends to the Reynolds Range. Passing through Heavitree Gap, and following the telegraph line, Alice Springs is situated on a boss of coarse red granite, which has greatly disturbed the country. To the north ridge, beyond Bond Springs cattle-station, we pass over numerous intrusive dykes of diorite, which have faulted the granite and schists. Plates of mica two and three inches square occur in the granite. A descent of only 40 feet from the north ridge leads down to the tertiary alluvial covering of the plain. The system of diorite dykes, which are met with north-east of Alice Springs, do not continue beyond the Mount Benstead ridge, the last one being met with at Mount Benstead well, where the dyke, by forming a bar across Love's Creek, dams back the soakage waters, and affords a limited supply to the well.

East of Alice Springs. the Macdonnells are formed of two nearly parallel ridges, the Undoolya and Benstead, which dip south and strike nearly east and west. The Hart Ranges, with which they converge and junction, have also two main ridges, the Georgina or Bald Hill ridge and the Hart Range proper. This system runs E.S.E., and dips northerly. Love's Creek and the Ross drain the first two ridges, and the Hale or Elder the two latter. From the chaotic jumble of mountains which are caused at the junction of the Benstead and Georgina Ranges, a range which I have called the Elder Range runs south-eastward, and has been traced by me to lat. 24° S. A section drawn through the system from the Ross Creek across through the ruby-fields to the Plenty River shows a great anticlinal axis, with four main faults indicated by the four ridges mentioned. At the Ross, the limestone series is surmounted by a fissile purple sandstone, apparently identical with that found on the Mount Charlotte ridge. It forms a ridge with a steep escarpment on the north side, and with the limestones ascending about half-way up. Proceeding up the

gorge, a section of an anticlinal fold is clearly shown, the first stratum being near the edge of a fault in the limestone which runs near the foot of the escarpment just mentioned, and along which the Love joins with the Ross.

North of the fault or at the mouth of the gorge, the stratum is a white gritty sandstone similar to that of the tableland hills, and is capped with a red glazing. Portions of the glazed section have fallen to the foot in huge masses, and have rounded by weathering into shapes suggestive of the appellation of turtle-backs. Following this comes the fissile sandstone, weathered red, and then the limestone series, the different bandings of which are displayed in the cliffs in zigzag contortions of striking aspect. In this series is the "Bitter Spring," the water of which tastes like quinine, it has no ill effect on man, and the camels drink it as though they would never be satisfied. The length of the gorge now lies altogether in this series, except at the extreme north end, where the crown of the anticline is distinctly shown, and then the fissile sandstone, surmounted by the argillaceous glazed-grit, again appears The white grit, with its porcelain capping, is termed the "Made Hills" by the diggers, which are well-known landmarks.

Beyond the "Made Hills" a fault brings up the schists and granites again, and diorite dykes, running E.S.E. through it, are numerous. The creek now occupies the end of an elevated valley-plain about twelve miles long and four wide, whose sides are composed of quartzite ridges, the south one dipping southward and the north one—the Georgina Range—dipping northward. The plain is therefore along the crest of the anticline, and has been formed by the degradation of the schists, which are now covered by a Tertiary alluvium. There is one patch of limestone lying flat on it in thin layers, but I am uncertain as to its relationship. Eastwards the plain contracts to about a mile in width, and then granitic dykes of small dimensions, and numerous thin leaders of quartz rock are found in micaceous schist and hornblendic schists, with diorite dykes on the northern edge. The quartz veins carry small spots of galena, argentiferous grey copper ore, brown iron-stone, and free gold in cavities, evidently marking the site of decomposed pyrites. This is the Paddy's Hole Goldfield, and receives its name from a rock waterhole in the southern quartzite ridge. Passing over the anticline through a broad faulted portion of the Georgina Ridge, another system of auriferous quartz veins in the neighbourhood of diorite dykes is crossed in the descent to the Hale or Elder River. Beyond the broad valley of this watercourse, which has large gum trees growing in its sandy bed, the Hart Range rises, and is about 16 miles across, and consists of the same series of beds as the other range, but which, though greatly faulted, are more easily inclined, especially at the

junction of the Florence and Maud Rivers, where the limestone beds appear flat, and have been weathered into such peculiar shapes that they have been termed the Castle Hills. The upturned schists throughout this area are thickly pierced with diorite dykes and converted into a coarse granular crystalline rock composed of large crystals of white felspar and brown mica. In the vicinity of the diorite it is studded with garnets, and has frequently been alluded to as garnet-sandstone. In the shingle of the creeks, which flow down through this series, the waterworn garnets are plentiful and having a hardness above the typical garnet, and of fair colour, have been collected and put into the market as "Australian rubies." On the north side of the range, or at head of Florence River, the quartzite ridge dips northward, with limestone knolls at its foot, and the steep escarpment of Mount Mabelle beyond reveals the fissile sandstone which rests on it, and dips away into the great plain beyond, where flat-topped hills and plains are strewn with ironstone nodules and chalcedony pebbles. The laminar schist forming the core of the plateau and ridges is frequently of peculiar appearance, due to the size and predominance of its felspar crystals. They are visible when standing a considerable distance back, and are similar to what has been aptly termed "swellings and eyes" by German geologists.

On the north end of the Elder Range, dividing the Lizzie from the Illogwa, the schistose structure is horizontally disposed, and the formation has been weathered into cheese-ring cones, to which the "swellings and eyes" impart a peculiarly grotesque appearance..

In the valley of the Illogwa is the dyke from which are procured the large plates of mica recently brought down to market; tourmaline and beryl accompany it. Eastward the country is unexplored, save for Winnecke's track, near the Queensland boundary.

The Elder Range is joined at Glen Annie by the two ridges which come past the Paddy's Hole Goldfield, and Glen Annie is the gorge through the anticline by which the Hale or Elder escapes from the valley south of the Hart Range.

Eight miles lower down the Undoolya ridge joins, and there are one or two subsidiary quartzite ridges below; and then the river, as far down as I explored it, to lat. 24° 7′, passes through the formation of the terraces, as met with along the Orraminna route and the channel of the Hugh.

Conclusion.

It is evident that the triangular portion of the plateau just described has been the scene of deep-seated uplifting forces at a

period subsequent to the deposition of the terraced formation, and that a sectional line from the Lake Eyre basin to the top of the plateau is through a regular sequence of formations in descending order, with only the one interruption caused by the exposure of schist and granite on the Finke at Polly's Springs. That this schist-ridge was upheaved long antecedent to the deposition of the strata now surrounding it is certain, otherwise the beds would have been tilted and the terraced formation of calcareous strata brought to the surface. It is probably an outlying extension of the rocks forming the base of the Musgrave Ranges. The synclinal undulations of the terraces becoming more and more sharply curved in approaching the Macdonnells, and finally becoming faulted and dislocated along with the rocks forming those ranges, is proof that their folding is due to the upheaving of that mass, and therefore that this portion of the plateau has been upheaved since the deposition of the terraced formation. From Dalhousie Springs to the Everard Plain on the top of the plateau is 300 miles in a straight line, and from Lake Eyre the distance to the same point is 500 miles. By the beds of the watercourses which drain its surface, this section is one continued gentle slope passing from sea level up to 2,700 feet, and so uniform is it that there is not a waterfall, or even a rapid, throughout the whole extent of the main creek channels. With regard to the geological age of this region the presence of fossils on the face of the slope up to an altitude of 800 feet places us on pretty sure ground and shows the age of deposition to be Mesozoic (and probably Cretaceous). Farther up the slope there must exist doubt until fossils are actually discovered, though it is a reasonable presumption that the beds throughout belong to one great series. With regard to the Macdonnells and the plateau the conformability of the rocks is certain, but should their age be considered archæan solely on the ground of their high degree of metamorphism? The diorite eruptions have evidently been the chief cause of metamorphism, and to their general strike or direction the whole northern side of the plateau conforms.

Further, did this intrusion of diorite take place late in the Mesozoic period, and uplift Central Australia into dry land. In such a case the great and gently sloping swell would eventually be cut up by surface waters and wind. The continental climate thus engendered being similar to that now existing would seldom cause floods to deepen the watercourses, and we might rather expect short creeks which soon spread out over the surface and their waters thus completely evaporate, leaving behind the matters previously held in solution. The finest particles would be carried furthest by the running waters, and two classes of

deposit would be caused. The lower beds would consist of the finer clays and sediments, and the upper beds nearest the streams source be the coarser and more sandy. Waters containing lime in solution deposit it readily when relieved of pressure, and also its iron when flowing among materials which furnish carbonic acid. But silica which is held in solution by water is only precipitated on complete evaporation, and therefore a country which receives such waters must eventually be covered with a floor of chalcedony, or if previously a sandy formation, the upper surface must be changed to a porcelainised sandstone. Eventually drainage along a few main lines or channels would be determined, and creeks formed such as we now know. Their channels would be continually widening and undercutting the porcelain covering, which, breaking off for want of support, ever presents a new face to wear, until at length the whole would be removed, or a few symmetrically shaped conical hills with their porcelain cappings be left standing about the plain in all directions.

Is not this the condition of Central Australia to-day—the flat-topped hills with porcelain caps giving way to coarser-grained grits with only glazed surfaces, and intermixed with calcareous and ferruginous matter, as we approach the head of the present drainage system? And are not the metamorphic rocks at this source composed almost entirely of bisilicates, which waters charged with alkaline bicarbonates will rapidly attack and waste, thus furnishing the material for the phenomena stated? By such reasoning one is tempted to regard the red quartzite as no other than the bottom of the sea which washed still older rocks forming the heart of the plateau to the northward, and which plateau, by the uplifting of its southern seaboard, has been extended down to the Macdonnell Ranges. The appearance of dry land in Central Australia during secondary times must have an interesting bearing on other features of Australia too great to discuss now. One point may, however, be referred to, and that is the elevation which the south shore of Australia is still undergoing, as evidenced by the cliffs of the Great Bight and other phenomena visible along our littoral.

The description which Maw and Washington has given of the Atlas Mountains and plains of Morocco are wonderfully like the regions dealt with in this paper. Chalcedony-capped flat-topped hills dot the plain, and igneous rocks raise Cretaceous strata to heights of 5,000 feet; while French geologists have on the eastern end seen Jurassic strata still higher, and pierced with diorite rocks.

One subject which is of great interest to geologists is the occurrence of obsidian bombs scattered throughout the whole

region. I have one from the Everard Plain, but they are most numerous among the portions of the plain whose surface is strewn with chalcedony and ironstone nodules. I found none *in situ*, but in the Peake Range, and afterwards in the Macdonnells, I picked up in the creek-debris fragments of what is apparently sanidine felspar, but of which the parent rock was not seen.

EXPLANATIONS TO PLATE.

FIG. 1.—SECTION ACROSS SOUTHERN END OF THE DENISON RANGE.

1. Table land sandstone (Tertiary).
2. Blue clay and gypsum (Cretaceous).
3. Ironstone mass.
4. Argillaceous and talcose slates } Primary.
5. Quartzite bands in argillaceous and hydro-mica slates }

FIG. 2.—SECTION ACROSS MIDDLE PORTION OF DENISON RANGE.

1. Table land sandstone (Tertiary).
2. Blue clays and Gypsum (Cretaceous),
3. Granite.
4. Syenite.
5. Argillaceous and hornblendic schists.
6. Quartzite bands and talcose slates.

FIG. 3.—ALGEBUCKINNA GOLD FIELD, R. NEALES.

1. Sandy kaolin ⎫
2. Gravel cement (auriferous) ⎪
3. Sandy cement ⎪
4. Gravel cement } Tertiary.
5. Sandy cement ⎪
6. Gravel cement ⎪
7. Compact sandstone ⎭
8. Argillaceous and Hornblendic Schists with Garnets and Copper.
9. Granite dyke.
10. Quartz-syenite dyke.

FIG. 4.—TYPICAL ESCARPMENT OF TABLE LAND.

1. Cretaceous clays with beds of shell limestone and gypsum.
2. Bed of nodular ironstone.
3. White sandy grits often argillaceous.
4. Porcelainised sandstone.

FIG. 5.—SECTION ACROSS MT. CHARLOTTE RANGE, 12 MILES NORTH OF CHAMBERS PILLAR.

1. Sandy thin beds of shale with manganic ironstone.
2. Siliceous limestone.
3. Calcareous earthy beds with seams of manganic ironstone.
4. Argillaceous limestones of oolitic structure.
5. Fissile sandstones.

FIG. 6.—SECTION ACROSS MACDONNELL RANGES TO GREAT PLATEAU.

Gums, and a Resin, produced by Australian Proteaceæ.

By J. H. Maiden, F.L.S., F.C.S., &c., Curator of the Technological Museum, Sydney.

(Communicated by Professor Rennie, M.A., D.Sc.)

[Read September 10, 1889.]

It is only of late years that the presence of gum in the Proteaceæ has been recorded. It has not even yet, the author believes, been noted as having been found on non-Australian species. In reproducing Deputy-Surgeon-General Shortt's statement as to the gum of *Grevillea robusta (infra)* the *Gardeners' Chronicle* excusably said (1882)—"The statement is a remarkable one, as none of the Proteaceæ were known to yield gum." The first record I can find of a Proteaceous gum is in Captain Lort Stokes' "Discoveries in Australia," ii., 132. The work was published in 1846, and he records gum from a Western Australian *Hakea*, termed "Holly" by the colonists and "Tool-gan" by the blacks. The second is a statement in the Catalogue of Western Australian Products at the Intercolonial Exhibition, Melbourne, 1866—"Gums of *Hakea* species are found *plentifully* (my italics) after the autumn rains." The next is by Dr. Cooke, who describes (1874) a sample of *Grevillea robusta* gum in the India Museum. This endemic Australian species is a common avenue-tree in Southern India and Ceylon. Then follow Surgeon-General Shortt's observations in South India in 1879-81 on gum of the same species. Still the same species yielded gum for Fleury's experiments in 1885, and the author now follows with records of the gum of five additional Proteads and the resin of a sixth.

These Proteaceous gums are not only of much botanical interest, but of high chemical importance. The present is the second occasion on which the presence of Pararabin has been recorded in any gum, so far as the author is aware. The first announcement of it having been found in gums is that of its discovery in *Sterculia* ("Kurrajong") gum by the author, and recorded in a paper in the *Pharmaceutical Journal* of London, vol. xix.) Pararabin had only been previously recorded from beetroot and carrots and from certain seaweeds. Pararabin differs from Metarabin in its solubility in dilute *acids*.

GREVILLEA ROBUSTA, *A. Cunn.*

"Silky Oak." Found in New South Wales and Queensland.

"In the India Museum is a sample of gum rather like that of *Moringa*, of a vinous-red colour, and but little soluble. It is said to have been obtained from this tree, which is cultivated to a limited extent in Mysore. It has a bright shining resinoid fracture, which it retains. It is much mixed with pieces of friable bark, to which it adheres. The gum is only botanically interesting" (Cooke, "Gums and Resins of India").

In some notes on the Shevaroy Hills for 1881, by Deputy-Surgeon-General Shortt, the following passage occurs:—"Of the plants introduced in these hills, I have to notice a peculiarity as regards *Grevillea robusta*. One tree, which is now eleven years old, has for the last two years during the rains produced spontaneously each year about ten ounces of a translucent gum, which has no smell or particular taste, is of a pale yellow colour, and mixes readily with water, when it forms a whitish-brown coloured mucilage, and as a paste answers all the purposes of the so-called gum arabic for adhesive purposes. The other Grevillea trees are some two or three years younger, and have not as yet evinced any disposition to produce gum." This finding of a gum so adhesive in the Proteaceæ is not borne out by the author's experiments.

Fleury experimented upon gum of this species from Algeria (*Journ. Pharm.* [5], ix., 479-480; *Journ. Chem. Soc.*, xlviii., 238). He speaks of it occurring "frequently," and being similar in appearance to cherry gum. It is yellowish-red, slightly translucent, and slightly friable. In water it swells a little, and slowly produces a very persistent white emulsion, which passes through all filters. It contains no starch, but gives 3 per cent. of ash, principally calcium carbonate and a little potash. The emulsion, treated with absolute alcohol, gives a copious precipitate of gum proper. When the alcoholic solution is evaporated it gives 5·6 per cent. of a reddish transparent resin, with slightly acid properties; this is soluble in alkalies and carbon bisulphide.

Common as this species is in this its native country of Australia, it has not yet been my good fortune to find any gum on it M. Fleury's specimen is almost a gum-resin; exudations from a *Hakea* and a *Xylomelum* examined by me yield true gums, with not a trace of resin. But *Grevillea striata* yields an exudation which is mainly resin, so we must come to the conclusion that the Proteaceæ yield both gums and resins.

GREVILLEA STRIATA, *R. Br.*, B. Fl., v. 462.

"Beef-wood." Found in South Australia, New South Wales, Queensland, and Northern Australia.

This particular sample came from Whittabranah, Wilcannia, N.S.W. It weighs several pounds, and was obtained in large pieces from two average trees, without using a ladder. Out of reach there was about an equal quantity to be seen, and which was left on the trees; a large quantity was also found lying on the ground, partially decomposed. It was so hard on the trees that a hammer and chisel were necessary to remove it.

It is quite free from odour, and has a dark reddish colour. When pure it has a bright fracture, but much of it is mixed with woody matter in a fine state of division. The warmth of the hand is sufficient to cause the resin to adhere to it. It sticks to the teeth, but is without taste. It is reduced to powder with the utmost facility, forming a dull powder. It is rather opaque looking.

In cold water the substance whitens slightly. If the water be boiled, the liquid becomes very turbid, reminding one of coffee with excess of milk and with abundant "grounds." No odour is developed.

Petroleum spirit extracts 5·2 per cent. of a hard, transparent, brownish resin.

The residue is acted upon by alcohol, which extracts 60·1 per cent. of a brownish resin.

This residue is then digested in water, which extracts 5·6 per cent. of a yellowish substance, consisting chiefly of arabin. The residue consists of 26·5 per cent. of a brownish substance which swells enormously in water, and which consists of metarabin (14 per cent.), while the remainder is accidental impurity.

Summary.—Resin soluble in petroleum spirit ...	5·2
" " alcohol	60·1
Soluble in water (arabin)	5·6
Metarabin	14·0
Accidental impurity	12·5
Moisture	1·7

The presence of metarabin in this exudation is remarkable, in view of the fact that pararabin is the main constituent of gums of this Natural Order. I have subjected my experiments to very careful repetition and revision. It contains no tannic acid.

The present is the first occasion in which a resin (or, to speak more correctly, a substance consisting mainly of resin) has been recorded from any Protead, so far as the author is aware, and certainly from any Australian species.

Hakea acicularis, *R. Br.*

The "plentiful" occurrence of *Hakea* gum in Western Australia has already been alluded to. In Southern New South

Wales a clear, hard, yellowish gum has been observed (May, 1888) on a shrub (*Hakea acicularis*, R. Br., B. Fl., v., 514) in small quantities.

Since the above was written Mr. R. T. Baker has been fortunate enough to discover gum on a twig of this species near the South Head Lighthouse, at Sydney. The leaves were dead, and matted together by the gum, which is most plentiful near where the wood has been destroyed by an insect. The whole branch as received at once gives the idea that the gum is a pathological product. On healthy branches of the same shrub no trace of gum could be seen. It is perfectly transparent, and of a pale amber colour, much resembling (in outward appearance) ordinary Black Wattle gum (*Acacia decurrens*). It is insipid, and when placed in water forms a smooth mucilaginous liquid, having much the consistency of tragacanth under similar circumstances (though without opalescence), and, like it, exceedingly difficult to filter. Following is an analysis :—

Soluble gum (arabin) ...	16·52
Pararabin	63·2
Moisture	19·1
Ash	1·6

Hakea Macraeana, *F. v. M.*

Found in Southern New South Wales. A recently discovered species. Height, 20 to 30 feet ; diameter, 4 to 14 inches. Sugar Loaf Mountain, Braidwood.

An almost colourless tasteless gum. Months after collection it is tasteless, like indiarubber, showing its retentiveness of moisture. It swells up in cold water to a great bulk, forming a gelatinous mass very similar to that yielded by Tragacanth under similar circumstances. It however retains the shape of the original pieces for a much longer period than does the latter substance. It seems scarcely to dissolve. Following is an analysis :—

Arabin	5·8
Pararabin	69·94
Moisture	22·7
Ash	1·32

A second sample has been received from Bembooka Mountain, Lyttleton, New South Wales It is a much finer specimen than the preceding, and I am able to make a more definite statement concerning it. It is from an aged tree, which has commenced to decay in the centre. It consists of large tears up to two inches long, and one inch broad, and attached to each of these large ones are a number of vermiform tears of two or three lines in

diameter. It is transparent, of hyaline or horny appearance, and from colourless up to pale amber. It reminds one irresistibly of Sterculia gum, and it is not a little interesting to find that the similarity also extends to their chemical composition. Following is an analysis :—

Arabin...	...	...	15·02
Pararabin	...	...	63·4
Moisture	...	...	21·0
Ash ...	...	...	1·4

A comparatively high percentage of arabin in a Proteaceous gum is a sign of its newness, and causes the formation of a viscid solution in water. When these gums have been exposed to the weather, more or less of the arabin is washed out, and the remaining soluble portion can be filtered off with great facility.

Persoonia linearis, *Andr.*, B. Fl., v. 397.

"Geebung." A very dark gum has been observed (12th June, 1888) on this species. It seemed to resemble that of *Grevillea striata*, but was not sufficiently abundant to collect.

Stenocarpus salignus, *R. Br.*, B. Fl., v. 539.

"Beef-wood," "Silky Oak," &c. Small quantities of gum have been seen on bruised trees of this species several times. The author looks upon gum as being usually a pathological product, and it is therefore most likely to be found on sickly and injured trees.

Xylomelum pyriforme, *Knight*, B. Fl., v. 408.

This is the well-known "Native Pear" of New South Wales. I am not aware that the finding of gum on this tree has been previously announced.

I found a small quantity of a yellowish-brown gum, tough, and of dull appearance, on a sapling which was six inches in diameter, but which had been cut down, leaving four feet of stump, from which there was a free growth of new leaves—a testimony also that the gum had exuded some time.

It swells up largely in cold water, and then disintegrates, forming masses of a nearly colourless jelly. I have analysed it with the following result :—

Arabin...	...	...	trace
Pararabin	...	...	79·56
Moisture	...	...	17·35
Ash ...	...	...	·55

It may, therefore, be considered to consist solely of pararabin.

Addendum.—The remarks made under *Persoonia linearis* may now be repeated, word for word, in regard to a Sydney "Honeysuckle" (*Banksia serrata*, Linn. fil). Can it be that this phenomenally wet season is the cause of the present abundance of gum on species already known to yield it, and on certain species (not confined to the Proteaceæ) on which it had not hitherto been recorded.

Notes on Certain "Pores" on the Veins of some Diptera.

By Frazer S. Crawford.

[Read Sept. 10, 1889.]

Plate IV.

There has lately been a controversy between two eminent dipterists, Dr. Williston, of the United States, and Mr. F. A. A. Skuse, of Sydney, whether the parasites of *Icerya Purchasi* and *Monophlebus Crawfordi* are identical; the affirmative view being originally promulgated by myself.

Dr. Williston had to base his opinion on specimens more or less mutilated, and without any certain knowledge of the host from which each was bred, whereas Mr. Skuse was enabled to breed the insects, and therefore to examine them to the best advantage.

Having lately had an opportunity of thoroughly re-examining the venation of the wings of these insects, I discovered that my original determination was incorrect; and I take this opportunity of corroborating Mr. Skuse's opinion that the insects are specifically distinct.

In the course of this investigation I discovered on certain veins peculiar processes, which I call "pores." These are very small bodies, circular in shape, hardly raised above the level of the vein, and apparently having an opening in the centre, but of this fact I do not feel at all sure. They are generally on the upper surface of the wing, are slightly darker in colour than the vein, and so small as to require a half inch objective to detect them. So far as my observations extend, they number from five to eight when present, and their number and position are constant in each species, and occasionally they are accompanied with a slight dilation of the vein at the spot where they appear (plate iv., fig. 2*a*).

Now on the last section of the third longitudinal vein of *Lestophonus Iceryæ*, Will., there are three of these pores (plate iv., fig. 1), but on the same part of *L. monophlebi*, Skuse, there are but two (figs. 2 and 2*a*). From the knowledge gained by examining other diptera, I feel confident that this apparently trifling difference is in reality a specific distinction of great importance.

Mr. Skuse has obligingly informed me that these "pores" are, he believes, homologous with what Jurine (Nouvelle methode du

classer les Hyménoptères et les Diptères ; 1807) named "Bullæ," observed by him in the wings of certain hymenopterous insects. It is strange that for eighty years these "Bullæ" or "Pores" have been either ignored or forgotten by succeeding dipterists. Not having M. Jurine's work to refer to, I cannot state what are his views with regard to these "Bullæ," but judging from the name bestowed (bulla, a boss or stud), he did not think they were of the nature of pores. On the other hand Mr. Skuse suggests that they are for the purpose of aerating the blood coursing through the veins. If this be their object the term "pore" is correct. Considering that some of the families of the the Diptera do not have them, that their position is limited to certain veins, viz., the junction of the first longitudinal with the costal, the third longitudinal, and the middle transverse vein ; and that in some places the pores are close together, whilst elsewhere they are relatively far apart, it really seems that if such be their object, nature was extremely capricious in arranging them and that she had neglected in this case that close adaptation of means to an end that characterises her work.

So far as my observations have extended, it would appear that the Diptera possessing large scales or hairs on their veins (*Culicidæ*, *Psychodidæ*, *Tipulidæ*) have no pores ; while the *Muscidæ*, *Syrphidæ*, and *Dolichopodidæ* have them. With one exception, a *Dolichopodida*, there is always a solitary pore on the middle transverse vein, and in this case the third longitudinal is so enlarged at this spot that the pore would otherwise be situated on the mid-transverse vein (fig. 8). My observations have not as yet extended to the Hymenoptera, but judging from Mr. Skuse's remark, only certain families possess them, as in the case of the Diptera.

Now that the attention of dipterists is called to these facts it is to be hoped that before long their true nature may be satisfactorily settled, and that they may sometimes be found of value in settling doubtful cases of affinity.

EXPLANATION OF PLATE IV.

Wings of the following Families, Genera or Species of the Diptera, showing the position of the pores.

Family Oscinidæ ? 1. Lestophonus Iceryæ. 2. L. monophlebi. 2*a*. Portion of the 3rd longitudinal vein showing dilation with pores. 2*b*. A pore very greatly magnified. 3. Sp. ?

Family Muscidæ. 4. Musca domestica. 5. Calliphora sp.

Family Tachinidæ. 6. Tachina ? sp.

Family Syrphidæ. 7. Sp.

Family Dolichopodidæ. 8. Sp. 8*a*. A portion of mid-transverse vein, being greatly enlarged.

A Revision of the Flora of Kangaroo Island and other Botanical Notes Relating thereto.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read December 4, 1888.]

In a "List of Plants additional to the Flora of Kangaroo Island" (Trans. Roy. Soc., S. Aust., for 1888, p. 290) are certain species recorded the correct identification of which I was disposed to challenge, and for this purpose the author of the list kindly submitted for my examination the majority of the species which formed the basis of that enumeration. After very careful study, so far as the condition of the specimens would allow, I offer the following corrections:—

Rhagodia parabolica is *Chenopodium glaucum.*
Pultenæa villifera is **P. canaliculata.*
Pultenæa prostrata is **P. involucrata.*
Acacia acinacea is *A. brachybotrya.*
Acacia brevifolia is *A. longifolia.*
Leptospermum erubescens is *L. lævigatum.*
Melaleuca ericifolia is *M. parviflora.*
Cryptandra amara is *C. hispidula.*
Spyridium pomaderroides, *Spyridium coactilifolium* are *Cryptandra obovata.*
Spyridium bifidum is **Cryptandra scabrida.*
Opercularia ovata is *O. varia.*
Vallisneria sp. is *Ruppia maritima.*
Blyxa Roxburghi is a confervoid.
Hydrilla verticillata is **Myriophyllum Muelleri.*
Aristida Behriana is *Ehrharta stipoides.*

Cassytha sp. is a variety of *C. pubescens* with warty stems, but is readily connected with the more common form on the mainland, having a smooth stem.

Tetratheca sp. is *T. ericifolia*, of which two varieties occur on Kangaroo Island—*a. var. aphylla*, which has rough leafless stems branching from the base, and large five-merous flowers; *b. var. pilosa*, which has very short, hispid, narrow-lanceolate leaves and smaller four-merous flowers.

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* Species now recorded for the first time.

Calycothrix sp. is not distinct from *C. tetragona*, except by its smaller pubescent leaves.

Hakea marginata. The specimen is incomplete for specific identification, but probably indicates a species new for South Australia. So far as the material serves it would seem to have a nearer relationship to *H. corymbosa.*

Lepyrodia sp. may be a stunted form of *L. Muelleri*, but the specimen does not permit of generic location with any degree of certainty.

Corrigenda to my List (vol. VI. of these Transactions, p. 149 *et seq.).*

Pomaderris apetala. This was included in the Flora, with a doubt, by Bentham, the specimen being in leaf only. I have little doubt now that it may have been a luxuriant branchlet of *P. racemosa.*

Cassinia lævis. This proves to be conspecific with *Humea punctulata*, but the correct designation will be *Cassinia punctulata*, F. v. M. and Tate. It is recorded as *Humea cassinacea* in the Ardrossan list, and as *Cassinia alasia*, F. v. M., M.S., from Coonalpyn, Ninety-mile Desert.

Toxanthus perpusillus was inserted by inadvertence for *T. Muelleri.*

Festuca bromoides should be erased, not being indigenous.

List of Additional Species, excluding those in the foregoing List.

Boronia parviflora. DeMole River (*R.T.*).
Eriostemon difformis. DeMole River (*R.T.*).
Stackhousia flava. DeMole River (*R.T.*).
Asperula oligantha. ——? (*Tepper !*). The leaves four in a whorl, and broadly ovate.
Brachycome cuneifolia. ——? (*Tepper !*). The leaves are entire or less toothed, and the achenes sparsely hairy on the thickened wing-like margins as compared with the type.
Senecio Cunninghami. Ravine des Casoars (*Tepper !*).
Goodenia amplexans. DeMole River (*R.T.*).
Mitrasacme distylis. —— ? (*Tepper*); recorded by Baron F. von Mueller, Vict. Naturalist, 2-1889.
Epacris impressa. DeMole River (*R.T.*); S.-Western River (*Tepper !*).
Sprengelia incarnata. South-Western River (*Tepper !*).
Pterostylis vittata. —— ? (*Tepper !*).
Pterostylis nutans. Cape Willoughby (*Horswell*, in herb. *Tepper !*).
Schœnus discifer. Dudley Peninsula (*R.T.*).

Lycopodium laterale. Head of Western River (*Tepper !*).
Selaginella Preissiana. Murray Lagoon and Karatta (*Tepper !*).
Ophioglossum vulgatum. Karatta (*Tepper !*).

A corrected list of the Kangaroo Island Plants is given in my Revised Census of South Australian Plants.* The number of species is 513, but I anticipate considerable augmentation when the moist shaded gullies of the wetter parts of the island shall have been thoroughly explored. This prediction is formed on the fact of the similarity of the flora with that of Port Lincoln, and that several species of the latter, which extend to Encounter Bay, have not yet been found on the island.

That the flora is a rich one is testified by the number of species; but as affording some evidence of the massing together of species in a limited area, I append a list of 118 species which were collected by me in a very hurried way, and without particular search for inconspicuous species, during an afternoon ramble on October 20 of this year in the vicinity of the DeMole River on the north-west coast.

The generalizations touching the origin and constitution of the flora, which I submitted to you five years ago, have not been materially affected by the large accessions of species gained during the interval. The number of extra-Australasian species has been increased by *Ophioglossum vulgatum* and the transference of *Erythræa australis* to *E. spicata;* but it has, on the other hand, been reduced by expurgation of *Festuca bromoides*, and the substitution of *Potamogeton Tepperi* for *P. natans* and *Epilobium glabellum* for *E. tetragonum;* the proportion of such to the whole flora is now one-tenth instead of between a seventh and an eighth. The sequence of the ordinal groups as regards numbers of species remains about the same; but the ratio of genera to species is slightly altered, the genera being 256 with 513 species, representing a ratio of one to two.

The number of peculiar species is 14; *Xanthorrhœa Tatei* is now known in the Port Lincoln district and at Mount Crawford, in the Mount Lofty Range; *Cryptandra halmaturina* also occurs at Encounter Bay, as recorded by Baron F. von Mueller (Phil. Soc., Melbourne, vol. 1855, p. 121), wherein the original diagnosis will be found. They are as follows:—Cheiranthera volubilis, *Bentham;* Bertya rotundifolia, *F. v. M.;* Cryptandra Waterhousei, *F. v. M.;* C. scabrida, *Tate;* Lhotzkya glaberrima, *F. v. M.;* L. Smeatoniana, *F. v. M.;* Melaleuca cylindrica, *R. Brown;* Pultenæa viscidula, *Tate;* Hydrocotyle crassiuscula, *Tate;* H. comocarpa, *F. v. M.;* Petrophila multisecta, *F. v. M.;*

*See post.

Achnophora Tatei, *F. v. M.*; Candollea Tepperiana, *F. v. M.*: Schœnus discifer, *Tate*.

List of Plants observed in the neighbourhood of DeMole River, Kangaroo Island.

Ranunculus parviflorus
Hibbertia stricta
" Billardieri
Cassytha pubescens
Viola hederacea
Drosera pygmæa
" auriculata
Comesperma calymega
Tetratheca ericifolia, vars. aphylla and pilosa
Thomasia petalocalyx
Lasiopetalum Schulzeni
Poranthera ericoides
" microphylla
Phyllanthus australis
Dodonæa viscosa
Oxalis corniculata
Zieria veronicea
Boronia parviflora
" filifolia
" Edwardsi
Eriostemon difformis
Correa speciosa
Claytonia calyptrata
Mesembrianthemum australe
Gompholobium minus
Daviesia brevifolia
Pultenæa daphnoides
" viscidula
Eutaxia empetrifolia
Dillwynia floribunda
Platylobium obtusangulum
Kennedya prostrata
Acacia retinodes
" myrtifolia (with phyllodia four to five inches long and a quarter wide)
Tillæa verticillaris
Loudonia Behrii
Haloragis teucrioides
Epilobium glabellum
Thryptomene ciliata
Baeckea diffusa
Leptospermum scoparium
Eucalyptus obliqua
" capitellata
" corynocalyx
" cosmophylla
" incrassata
Stackhousia flava
Cryptandra vexillifera
" Waterhousei
Pimelea ligustrina
" spathulata
" octophylla
" phylicoides
" flava
Petrophila multisecta
Isopogon ceratophyllus
Adenanthos terminalis
" sericeus
Conospermum patens
Grevillea aspera
" halmaturina
Hakea rostrata
Banksia marginata
" ornata
Choretrum glomeratum
Apium prostratum
Daucus brachiatus
Opercularia varia
Aster floribundus
Achnophora Tatei
Calocephalus Brownii
Ixodia achilleoides
Ixiolæna supina
Helichrysum obtusifolium var. tephroides
Gnaphalium japonicum
Stuartina Muelleri
Erechthites prenanthoides
Cymbonotus Lawsonianus
Candollea despecta
Wahlenbergia gracilis
Goodenia geniculata
" amplexans
Scævola aemula
Mitrasacme paradoxa
Logania ovata
Plantago varia
Utricularia dichotoma
Myosotis australis
Prostanthera spinosa
Styphelia Sonderi
" concurva
" fasiculiflora
Epacris impressa
Casuarina quadrivalvis
" distyla
Thelymitra flexuosa
Caladenia carnea
Patersonia glauca
Sisyrinchium cyaneum
Bulbine semibarbata

Thysanotus Patersoni
Xanthorrhœa Tatei
Triglochin procera
Juncus pauciflorus
" pallidus
Calastrophus fastigiatus
Centrolepis aristata
" strigosa
Schœnus Tepperi
Lepidosperma filiforme
Cladium schœnoides
" filum
Caustis pentandra
Carex paniculata
Sporobolus virginicus
Pteris aquilina
Lomaria discolor
Cheilanthes tenuifolia

A Census of the Indigenous Flowering Plants and Vascular Cryptogams of Extra-Tropical South Australia.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 2, 1889].

Plate V.

Since the publication of a Census of the Native Plants of South Australia, in the volume of these Transactions for 1880, much activity has been shown in botanical research—greatly extending our knowledge of the species and their distribution, that it is deemed desirable to submit a Revised List.

To give some idea of the distribution of the constituents of the flora of extra-tropical South Australia, this part of the province is divided into the following regions and districts, as indicated on the accompanying map.

I. The Eremian Region.

This is limited by the rainfall-line of about ten inches, which dividing line on the south closely approximates to "Goyder's rainfall-line"—demarking the northern limit of successful wheat-cultivation. It comprises the "salt-bush" country of the pastoralist. About one-sixth of the species are extra-Australasian, chiefly of the Indo-Malay Province, whilst a large proportion of the endemic species belong to exotic genera.*

District F. This embraces the elevated country to the north of the Lake Eyre Basin, and drained by the tributaries of the River Finke, which have their sources in the McDonnell Range. The average annual rainfall does not exceed ten inches, but it is very irregular in its distribution.

District C. This is the most characteristic section of the Eremian Region; it is subject to severe droughts, and the rainfall does not exceed seven inches. It extends in a northerly direction, certainly as far as Charlotte Waters, is for the most part of low elevation, and comprised of Cretaceous and Tertiary clays and sands, except outlying masses of the Flinders Range which form hilly tracts of limited extent.

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* See Proc. Austr. Assoc. for the Advancement of Science, 1888, p. 312.

District S. This has a slightly increased rainfall as compared with C, and is mostly comprised of elevated ground in parallel ranges of not inconsiderable height, collectively called the Flinders Range. Outlying areas of District N., far within its boundary, occur at Wilpena Pound, at Blinman, and in a modified degree about Mount Serle; the inclusion of so many southern forms in the list for this district somewhat masks the truly desert-character of its prevailing flora. For its southern limit, I use the watershed-line, demarking the northern from the southern stream-courses.

District W. This is the south-western extension of C., and presents much the same physical characters. However, in the Gawler Range, there occurs a small collection of species, which belongs to more southern latitudes; otherwise the flora is essentially Eremian.

District M.—This area in its northern parts is a southerly extension of C and S; it comprises the Murray Desert, a plain which abuts on the west against the Adelaide Chain, and its north-east extension to the Barrier Range, and is constituted of Eocene and Pliocene strata, which are highly absorbent to water. Its south-western and southern limits, as defined by geological and topographical features, reach beyond the rainfall line of ten inches; and it becomes a question where best to fix the boundary, though on the whole there is an abrupt change in the flora wherever we pass from the Archæan to the Eocene rocks. The terrestrial flora is largely comprised of Eremian species, but the fluviatile and paludinal species are essentially Euronotian.

II. The Euronotian Region.

The flora of this region is of the type dominant in the wetter parts of temperate Australia, except the extreme south-west. It is essentially an aboriginal flora, being largely composed of endemic genera and species.

District A. Herein is presented one of the chief subtypes of the Euronotian flora, or at least such of it as occurs on the higher elevations of the Adelaide chain; the plants of the plains are more widely distributed throughout the Euronotian region of Australia.

District N. This comprises the country to the north of a line from the head of St. Vincent Gulf to the Burra. The elevated country about Wirrabirra and Mount Remarkable, with its relatively high rainfall, forms a small botanical outlier of the Adelaide chain.

District Y. The flora of Northern Yorke Peninsula is an extension of that of N; that of the southern part is not known, but we may anticipate certain affinities with L and K.

District L. Comprises Southern Eyre Peninsula, or the Port Lincoln district, and the costal tract extending to about Fowler Bay. The flora is essentially Euronotian, but the absence of certain characteristic species of A, and the presence of identical or closely-allied species of the Swan River district, impart a distinctinctive feature.

District K. The flora of Kangaroo Island is largely comprised of species proper to A and L, whilst it contains also species of Autochthonian origin which have here their eastern limit, and others of Victorian and Tasmanian origin which here reach their westernmost limit; it moreover contains several restricted species and one genus.

District T. Comprises the country south of M and east of Lake Alexandrina, and includes the Ninety-mile Desert and the Tatiara. It is largely constituted of Pliocene and Pleistocene sands and clays, occupying a low-lying region subject to inundation, and largely interspersed with marshes. In its south-east direction it is bounded by the low plateau of Eocene-limestones constituting the Mount Gambier district.

This district has not been botanically explored in any systematic manner; its species for the most part are Adelaidean, but towards the Victorian frontier it has received a few species which are restricted to the southern parts of the Wimmera-country.

District G. The extreme south-east corner of this colony is well defined both geologically and meteorologically. Physically it is an elevated plain comprised of Eocene-limestones, on which are reared cones of volcanic debris to heights of about 700 feet. The rainfall exceeds 25 inches within a line drawn from Guichen Bay to about Penola, though the limestone plateau continues northward beyond Narracoorte; within this area, thus roughly defined, many species characteristic of Southern Victoria and even of Tasmania have their most western limits, the most notable of which is the Sambucus, whilst the bulk of the species occurs in district A. None of its species are restricted.

RANUNCULACEAE.

Clematis, Linne (1737).

aristata, *R. Brown*	...	...	...	...	...	...	...	...	...	G
microphylla, *DeCandolle*	...	...	S	.	M	A	N	Y	L	K	T	G

Ranunculus, Linne (1737).

aquatilis, *Linne*	...	...	...	S	.	M	A	.	.	L	.	T	G
lappaceus, *Smith*	...	...	...	S	.	.	A	N	.	L	.	T	G
rivularis, *Banks & Solander*		...	.		M	A	N	.	.	K	T	G
parviflorus, *Linne*	...	...	C	S	W	M	A	N	Y	L	K	T	G

Myosurus, Linne.

minimus, *Linne*	...	...	...	S	.	M	.	.	.	.	.	T

DILLENIACEAE.

Hibbertia, Andrews (1800).

hirsuta, *Bentham*						A						
sericea, *Bentham*						A	.	.	L	K	T	G
stricta, *R. Brown*					M	A	N	Y	L	K	T	G
Billardieri, *F. v. Mueller*						A	.	.	.	K		G
acicularis, *F. v. Mueller*						A	.	.	.	.	.	G
virgata, *R. Brown*				W	M	A	.	Y	.	K	.	.
fasciculata, *R. Brown*						A	.	.	L	K	T	G
glaberrima, *F. v. Mueller* ...	F											

LAURACEAE.

Cassytha, Osbeck (1753).

glabella, *R. Brown*						A	.	Y	L	K	.	G
pubescens, *R. Brown*					M	A	.	Y	L	K	.	G
melantha, *R. Brown*				W	M	A	.	Y	L	K	T	G

CERATOPHYLLEAE.

Ceratophyllum, Linne (1735).

demersum, *Linne*					M							

PAPAVERACEAE.

Papaver, Linne.

aculeatum, *Thunberg*					M	A	N	Y	L	K	.	.

CAPPARIDAE.

Cleome, Linne.

viscosa, *Linne*			F									

Capparis, Linne.

lasiantha, *R. Brown*		C										
spinosa, *Linne*		F										
Mitchelli, *Lindley*	F	C	S	.	M							

CRUCIFERAE.

Nasturtium, R. Brown (1812).

terrestre, *R. Brown*					M	A					T	G

Cardamine, Linne.

eustylis, *F. v. Mueller*					M							
laciniata, *F. v. Mueller*					M	A	.	Y			T	G
flexuosa, *Withering*						A	N					G

Barbarea, Beckmann (1801).

vulgaris, *R. Brown*						A						

Erysimum, Linne.

curvipes, *F. v. Mueller*... ... ... S W M . N
brevipes, *F. v. Mueller*... ... C S W M . N Y
lasiocarpum, *F. v. Mueller* ... F C . . M . . Y T .
Blennodia, *F. v. Mueller* ... F C S W

Sisymbrium, Linne.

filifolium, *F. v. Mueller* ... ... S W . N
trisectum *F. v. Mueller* ... F C S W M
nasturtioides, *F. v. Mueller* ... ... S W M . N
procumbens, *Tate* ... ... S
Richardsii, *F. v. Mueller* ... ... W
cardaminoides, *F. v. Mueller* ... C M T G

Cakile, Linne.

maritima *Scopoli* ... ... K

Stenopetalum, R. Brown (1821).

velutinum, *F. v. Mueller* ... F C . . M
lineare, *R. Brown* ... ... F . S . M A N Y L . . G
nutans, *F. v. Mueller* ... ... F C
sphaerocarpum, *F. v. Mueller*... ... ... A N Y T
trisectum, *Tate* C

Geococcus, Drummond & Harvey (1855).

pusillus, *Drummond & Harvey* ... W M Y

Alyssum, Linne.

minimum, *Pallas* ... ... S W M . N Y

Menkea, Lehmann (1843).

australis, *Lehmann* ... ... M
sphaerocarpa, *F. v. Mueller* ... F

Capsella, Moench (1792).

pilosula, *F. v. Mueller* ... ... W M Y
elliptica, *F. v. Mueller*... ... ... S W M A N Y L K T G
humistrata, *F. v. Mueller* ... ... M
cochlearina, *F. v. Mueller* ... ... S W N
Drummondi, *F. v. Mueller* ... ... W

Lepidium, Linne.

strongylophyllum, *F. v. Mueller* F
leptopetalum, *F. v. Mueller* ... ... S M
rotundum, *DeCandolle* ... ... F C
phlebopetalum, *F. v. Mueller*... F C S M
monoplocoides, *F. v. Mueller* ... C M Y
papillosum, *F. v. Mueller* ... F C S W M N
ruderale, *Linne* ... ... F C S . M A N Y . K T G
foliosum, *Desvaux* ... ... K T

VIOLACEAE.

Viola, Linne.

hederacea, *Labillardiere* ... ... A K G
betonicifolia, *Smith* ... ... A G

Hybanthus, Jacquin (1763).

floribundus, *F. v. Mueller* ... ... W A T G
enneaspermus, *F. v. Mueller* ... F
Tatei, *F. v. Mueller* ... ... S

Hymenanthera, R. Brown (1818).

Banksii, *F. v. Mueller* ... ... A

DROSERACEAE.

Drosera, Linne (1737).

binata, *Labillardiere* ... ... A . . . . . G
glanduligera, *Lehm.* ... ... A Y L K T G
Whittakerii, *Planchon*... ... ... A Y . K T G
pygmaea, *DeCandolle* ... ... A L K T G
spathulata, *Labillardiere* ... ... G
Burmanni, *Vahl*... ... ... F
Indica, *Linne* ... ... F
Menziesii, *R. Brown* ... ... C A N Y L K . G
auriculata, *Backhouse* ... ... S A N K . G
peltata, *Smith* ... ... A N . L T G

FRANKENIACEAE.

Frankenia, Linne.

laevis, *Linne* ... ... F C S W M A N Y L K T G

PITTOSPOREAE.

Pittosporum, Banks (1788).

phillyraeoides, *DeCandolle* ... F C S W M A N Y L K T G

Bursaria, Cavanilles (1797).

spinosa, *Cavanilles* ... . S . M A N Y L K T G

Marianthus, Huegel (1837).

bignoniaceus, *F. v. Mueller* ... ... A K

Billardiera, Smith (1793).

scandens, *Smith*... ... ... L K G
cymosa, *F. v. Mueller* ... ... A N Y L K T G

Cheiranthera, Cunningham (1829).

linearis, *Cunningham* ... ... A N Y L K
volubilis, *F. v. Mueller* ... ... K

POLYGALEAE.

Polygala, Linne.

Chinensis, *Linne* ... ... F

Comesperma, Labillardiere (1806).

scoparium, *Steetz*				W	M					L				
volubile, *Labillardiere*						...	A		Y	L	K	.	G	
sylvestre, *Lindley*		F	.	S										
viscidulum, *F. v. Mueller* ...		F												
calymega. *Labillardiere*						...	A			L	K	T	G	
polygaloides, *F. v. Mueller*						...	A			L	K	T	G	

ELATINEAE.

Elatine, Linne (1737).

Americana, *Arnott*				S		M								G

Bergia, Linne (1771).

ammannioides, *Roxburgh* ...		C			M									
perennis, *F. v. Mueller* ...	F													

HYPERICINEAE.

Hypericum, Linne.

Japonicum, *Thunberg*	F	C				A	N	.	.	K	T	G		

RUTACEAE.

Correa, Smith (1798).

aemula, *F. v. Mueller*					...	A					K		G	
alba, *Andrews*					...	A					K		G	
speciosa, *Andrews*				W	.	A	N	Y	L	K	T	G		
decumbens, *F. v. Mueller*					...	A				K				

Zieria, Smith (1798).

veronicea, *F. v. Mueller*					...	A				K				

Boronia, Smith (1798)

Edwardsi, *Bentham*					...	A				K				
coerulescens, *F. v. Mueller*				W		A	N		L	K	T	G		
filifolia, *F. v. Mueller*					...	A				K	T	G		
clavellifolia, *F. v. Mueller*				W	.			Y		.	T			
parviflora, *Smith*					...	A				K				
polygalifolia, *Smith*					...	A						G		
pinnata, *Smith*					...	...		...	...		T	G		

Eriostemon, Smith (1798).

obovalis, *Cunningham*					...	...		...		T				
linearis, *Cunningham*				W										
difformis, *Cunningham*				W	M	A			L	K	T			
lepidotus, *Sprengel*					.	.		.	.	.	T			
stenophyllus, *F. v. Mueller*					...		...		...		T			
sediflorus, *F. v. Mueller*				W	M		N	Y			T			
pungens, *Lindley*					...	A			L		T			
Hillebrandi, *F. v. Mueller*					...	A								
brachyphyllus, *F. v. Mueller*					...	A			L					
capitatus, *F. v. Mueller*				W			N	Y	L	K				

Geijera, Schott (1834).

salicifolia, *Schott* ... ... M
parviflora, *Lindley* ... ... S W M · N Y L K

MELIACEAE.

Owenia, F. v. Mueller (1857).

acidula, *F. v. Mueller* ... ... F

LINEAE.

Linum, Linne.

marginale, *Cunningham* ... ... M A N Y L T G

ZYGOPHYLLEAE.

Tribulus, Linne (1735).

terrestris, *Linne* ... ... F C S W M T
hystrix, *R. Brown* ... ... F C
macrocarpus, *F. v. Mueller* ... F
Forrestii, *F. v. Mueller* ... F
platypterus, *Bentham* ... ... F
hirsutus, *Bentham* ... ... F
astrocarpus, *F. v. Mueller* ... F

Zygophyllum, Linne (1735).

apiculatum, *F. v. Mueller* ... F S W M N
fruticulosum, *DeCandolle* ... F C S W M . N Y
ammophilum, *F. v. Mueller* ... F C W M Y L K T
Billardieri, *De Candolle* ... C S W M A ? Y L K T G
prismatothecum, *F. v Mueller* ... S
Howittii, *F. v. Mueller* ... C S
glaucescens, *F. v. Mueller* ... C W M A N Y L
crenatum, *F. v. Mueller* ... ... W M N Y
iodocarpum, *F. v. Mueller* ... F C S W M

Nitraria, Linne (1759).

Schoeberi, *Linne* ... ... C S W M A N Y L K T

GERANIACEAE.

Pelargonium, L'Heritier (1787).

australe, *Willdenow* ... ... S A N Y L K T G
Rodneyanum, *Mitchell*... ... ... A T G

Geranium, Linne.

pilosum, *Solander* ... ... S W M A N Y L K T G

Erodium, L'Heritier (1787).

cygnorum, *Nees*... ... ... F C S W M A N Y L K T G

Oxalis, Linne (1737).

corniculata, *Linne* ... ... F . S W M A N Y L K T G

SAPINDACEAE.

Diplopeltis, Endlicher (1837).

Stuartii, *F. v. Mueller* ... ... F

Atalaya, Blume (1847).

hemiglauca, *F. v. Mueller* ... F C

Heterodendron, Desfontaines (1818).

oleaefolium, *Desfontaines* ... F C S W M . N Y

Dodonaea, Linne (1737).

viscosa, *Linne*	F	C	S	W	M	A	N	Y	L	K	T	G
petiolaris, *F. v. Mueller* ...	F											
lanceolata, *F. v. Mueller* ...	F											
procumbens, *F. v. Mueller* ...	...		...		...		...		...		...	G
lobulata, *F. v. Mueller* ...	...		S	W	M		N					
bursarifolia, *Behr & F. v. M.* ...	...		...		M	A		Y		K		
Baueri, *Endlicher*	...		...		M		N	Y	L	K		G
hexandra, *F. v. Mueller* ...	...		...		...	A		Y	L			
humilis, *Endlicher*	...		W					Y	L	K	T	
boronifolia, *G. Don*	...		...		...		...	Y				
macrozyga, *F. v. Mueller* ...	F											
tenuifolia, *Lindley*	...		S									
stenozyga, *F. v. Mueller* ...	...			W				Y			T	
microzyga, *F. v. Mueller* ...	F	C	S	W			N					

STACKHOUSIEAE.

Stackhousia, Smith (1798).

megaloptera, *F. v. Mueller* ...	...	F									
spathulata, *Sieber*	...		...		...		...		...	K	G
linarifolia, *Cunningham* ...	...		...		M	A	N	Y	L	K	T	G
flava, *Hooker*	...		...			A		Y	L	K		
muricata, *Lindley*	F											
viminea, *Smith*	F											

Macgregoria, F. v. Mueller (1873).

racemigera, *F. v. Mueller* ... F

PHYTOLACCEAE.

Didymotheca, J. Hooker (1847).

thesioides, *Hooker*	...		...		...		...	Y	L	K	G
pleiococca, *F. v. Mueller* ...	F				M	A				K	T	G

Gyrostemon, Desfontaines (1820).

ramulosus, *Desfontaines* ... F W

Codonocarpus, Cunningham (1830).

pyramidalis, *F. v. Mueller* ...			S				
cotinifolius, *F. v. Mueller* ...	F	C			M		N

MALVACEAE.

Plagianthus, R. & G. Forster (1776).

Berthae, *F. v. Mueller*... ...										Y				
spicatus *Bentham*						M				Y		K	T	G
glomeratus, *Bentham*	F	C	S	W						Y	L			
microphyllus, *F. v. Mueller* ...							A	N	.	L	.	T	G	

Sida, Linne (1737).

corugata, *Lindley*	F	C	S	W	M	A	N	Y						
intricata, *F. v. Mueller* ...		C					N							
virgata, *Hooker*	F	C	S	W										
cardiophylla, *F. v. Mueller* ...	F													
cryphiopetala, *F. v. Mueller* ...	F													
petrophila, *F. v Mueller* ...	F	C	S	W			N							
calyxhymenia, *J. Gay*		...		W										
rhombifolia, *Linne*	F													
inclusa, *Bentham*	F	C												
platycalyx, *F. v. Mueller* ...	F													
lepida, *F. v Mueller*	F													

Howittia, F. v. Mueller (1855).

trilocularis, *F. v. Mueller* ...	...	...	...	...	...	...	T							

Abutilon, Gaertner (1791).

tubulosum, *Hooker*	F													
leucopetalum, *F. v. Mueller* ...		C												
Mitchelli, *Bentham*	F		S											
cryptopetalum, *F. v. Mueller* ...	F													
otocarpum, *F v. Mueller* ...	F	C			M									
Avicennae, *Gaertner*		C			M									
oxycarpum, *F. v. Maeller* ...		C												
Fraseri, *Hooker*	F	C	S											
halophilum, *F. v. Mueller* ...		C	S											
macrum, *F. v. Mueller*	F			W										

Lavatera, Linne.

plebeia, *Sims*	F	C	S	W	M	A	N	Y	L	K	T	G		

Malvastrum, Asa Gray (1849).

spicatum, *A. Gray*	F	C	S	W										

Hibiscus, Linne (1735).

trionum, Linne		C												
brachysiphonius, *F. v. Mueller*		C												
microchlaenus, *F. v. Mueller* ...	F	.	.	W										
Pinonianus, *Gaudichd.*... ...	F	C												
Krichauffii, *F. v. Mueller* ...		C	S	W	M									
Sturtii, *Hooker*	F	C												
Farragei, *F. v. Mueller*... ...	F			W										
Wrayae, *Lindley*		...		W				N	Y	L				
hakeaefolius, *Giord.*		...	S	W						L				

Gossypium, Linne (1737).

australe, *F. v. Mueller*	F													
Sturtii, *F. v. Mueller*	F	C	S											

TILIACEAE.

Triumfetta, Linne.

Winneckeana, *F. v. Mueller* ... F

Corchorus, Linne.

sidoides, *F. v. Mueller* ... ... F
Elderi, *F. v. Mueller* ... ... F

STERCULIACEAE.

Hermannia, Linne.

Gilesii, *F. v. Mueller* ... ... F

Waltheria, Linne (1737).

Indica, *Linne* ... ... F

Melhania, Forskael (1775).

incana, *Heyne* ... ... F

Commergonia, R. & G. Foster (1776).

magniflora, *F. v. Mueller* ... F
loxophylla, *F. v. Mueller* ... F
Kempeana, *F. v. Mueller* ... F
Tatei, *F. v. Mueller* L

Brachychiton,, Schott & Endlicher (1832).

Gregorii, *F. v. Mueller* ... ... F

Seringia, Sprengel (1818).

corollata, *Steetz* ... ... F
nephrosperma, *F. v. Mueller* ... F
integrifolia, *F. v. Mueller* ... F

Hannafordia, F. v. Mueller (1860).

Bissillii, *F. v. Mueller* ... ... F

Thomasia, J. Gay (1821).

petalocalyx, *F. v. Mueller* ... ... A . Y L K T

Lasiopetalum, Smith (1798).

discolor, *Hooker* ... ... W A Y L K G
Behrii, *F. v. Mueller* ... ... M A N Y L K
Baueri, *Steetz* ... ... W . A . Y L K T
Tepperi, *F. v. Mueller* ... ... Y
Schulzenii, *F. v. Mueller* ... ... L K T G

TREMANDREAE.

Tetratheca, Smith (1793).

ciliata, *Lindley* ... ... G
ericifolia, *Smith* ... ... A K G

EUPHORBIACEAE.

Euphorbia, Linne (1737).

erythrantha, *F. v. Mueller* ... C S W M
Drummondii, *Boissier* ... ... F C S W M A N Y T
Wheeleri, *Baillon* C
eremophila, *Cunningham* ... F C S W M A N

Poranthera, Rudge (1811).

microphylla, *Brongniart* ... ... M A Y L K T G
ericoides, *Klotzsch* ... ... A L K

Micrantheum, Desfontaines (1818).

hexandrum, *Hooker* ... ... A K

Pseudanthus, Sieber (1837).

micranthus, *Bentham* ... ... A

Phyllanthus, Linne (1737).

thesioides, *Bentham* ... ... F
rigens. *J. Mueller* ... ... S
rhytidospermus, *F. v. Mueller* F . S
Tatei, *F. v. Mueller* ... ... A N
calycinus, *Labillardiere* ... ... S N L T
Fuernrohrii, *F. v. Mueller* ... C S M
trachyspermus, *F. v. Mueller*... ... ... M
lacunarius, *F. v. Mueller* ... F C S M
australis, *J. Hooker* ... ... K
thymoides, *Sieber* ... ... A K T
Gunnii, *J. Hooker* ... ... S A N

Amperea, A. de Jussieu (1824).

spartioides, *Brongniart* ... ... G

Monotaxis, Brongniart (1829).

luteiflora, *F. v. Mueller* ... F

Beyeria, Miquel (1844).

viscosa, *Miquel* ... ... A .
opaca, *F. v. Mueller* ... ... W M A . Y L K T G
uncinata, *F. v Mueller* ... ... M

Ricinocarpus, Desfontaines (1817).

pinifolius, *Desfontaines*... ... ...

Bertya, Planchon (1845).

Mitchelli, *J. Mueller* ... ... M A
rotundifolia, *F. v. Mueller* ... ... K

Adriana, Gaudichaud (1825).

quadripartita, *Gaudichaud* ... ... M A . Y L K T G
tomentosa, *Gaudichaud* ... F M

PORTULACEAE.

Portulaca, Linne.

oleracea, *Linne* ... ... F C S M
australis, *Endlicher* ... ... F
filifolia, *F. v. Mueller* ... ... F C
bicolor, *F. v. Mueller* ... ... F

Claytonia, Linne (1737).

pleiopetala, *F. v. Mueller* ... C W
Balonnensis, *F. v. Mueller* ... F C S W
polyandra, *F. v. Mueller* ... ... S W
volubilis, *F. v. Mueller* ... ... S W M A N Y L K T
ptychosperma, *F. v. Mueller* ... C S
brevipedata, *F. v. Mueller* ... ... A L
calyptrata, *F. v. Mueller* ... ... A Y L K
pumila, *F. v. Mueller* ... ... F
corrigiolacea, *F. v. Mueller* ... F M Y L
Australasica, *Hooker* ... ... A G
pygmaea, *F. v. Mueller* ... ... M A Y T

CARYOPHYLLEAE.

Saponaria, Linne (1737).

tubulosa, *F. v. Mueller*... ... ... S M A N Y T

Stellaria, Linne (1753).

pungens, *Brongniart* ... ... G
glauca, *Withering* ... ... M A K G
multiflora, *Hooker* ... ... M . N G

Drymaria, Willdenow (1819).

filiformis, *Bentham* ... ... M Y

Sagina, Linne (1737).

apetala, *Linne* ... ... S M A N Y . K . G

Colobanthus, Bartling (1830).

Billardieri, *Fenzl* ... ... G

Spergularia, Persoon (1805).

rubra, *Cambessedes* ... ... S W M A N Y L K T
marina, *Wahlenb.* ... ... M A N Y . K T

Polycarpon, Linne (1758).

tetraphyllum, *Linne* ... ... A L

Polycarpaea, Lamarck (1792).

synandra, *F. v. Mueller* ... C
Indica, *Lamarck* ... ... F C

ILLECEBRACEAE.

Herniaria, Linne.

incana, *Lamarck* ... ... S . M

Scleranthus, *Linne* (1737).

pungens, *R. Brown*				W	M	A	N	.	L	.	T	
diander, *R. Brown*												G

POLYGONACEAE.

Rumex, Linne (1737).

Brownii, *Campdera*						A		Y	L	K		G
flexuosus, *Solander*					M	A						
crystallinus, *Lange*	F	C			M							
bidens, *R. Brown*					M	A						G

Polygonum, Linne.

plebeium, *R. Brown*	F	C			M	A					T	
prostratum, *R. Brown*					M	.	N					G
lapathifolium, *Linne*												G
hydropiper, *Linne*												G
minus, *Hudson*			S		M	A	.					G
attenuatum, *R. Brown*		C										

Muehlenbeckia, Meissner (1840).

adpressa, *Meissner*				W	.	A	.	Y	L	K	.	G
Cunninghamii, *F. v. Mueller*	F	C	S		M	A			L		T	
polygonoides, *F. v. Mueller*					M							

CHENOPODIACEAE.

Atriplex, Linne.

stipitatum, *Bentham*			S	W	M							
paludosum, *R. Brown*				W	.	A	N	Y	L	K		
mummularium, *Lindley*	F	C	S	W	M							
cinereum, *Poiret*					M	A	N	Y	L	K	T	G
vesicarium, *Heward*	F	C	S	W	M	.	N					
rhagodioides, *F. v. Mueller*		C	S	.	M							
incrassatum, *F. v. Mueller*		C										
velutinellum, *F. v. Mueller*	F	C	S	W	M							
fissivalve, *F. v. Mueller*		C	S	W								
Quinii, *F. v. Mueller*		C	S									
angulatum, *Bentham*		C	S	.	M							
semibaccatum, *R. Brown*					M	A						
Muelleri, *Bentham*	F	.	S		M			Y				
prostratum, *R. Brown*			S		M	.	N	Y	L	K		
leptocarpum, *F. v. Mueller*	F	C	S		M							
limbatum, *Bentham*	F		S		M							
crystallinum, *Hooker*												G
halimoides, *Lindley*		C	S	W	M							
holocarpum, *F. v. Mueller*	F	C	S	W	M							

Dysphania, R. Brown (1810).

plantaginella, *F. v. Mueller*	F	.	.	W								
simulans, *F. v. Mueller & Tate*	F	C										
litoralis, *R. Brown*		C	S	.	M			.				

Rhagodia, R. Brown (1810).

Billardieri, *R. Brown*					M	A	.	Y	L		T	G
parabolica, *R. Brown*			S		M	A	N	Y			T	
Gaudichaudiana, *Moquin*			W	M								
crassifolia, *R. Brown*	C		W	M				Y	L	K	T	
Preissii, *Moquin*			W	.				Y				
spinescens, *R. Brown*	F	C	S	W	M			Y				
nutans, *R. Brown*	F	C	S	.	M	A		Y	L	K	T	

Chenopodium, Linne.

nitrariaceum, *F. v. Mueller*			S	W	M	A	.	Y				
auricomum, *Lindley*	F	C	S	.	M							
microphyllum, *F. v. Mueller*				...	M	A	N	Y	L			
rhadinostachyum, *F. v. Mueller*	F											
carinatum, *R. Brown*	F	C	S	W	M	A	N	Y	.	K	.	G
cristatum, *F. v Mueller* ...		C	S	W	M	.	N					
atriplicinum, *F. v. Mueller* ...		...	S		M							

Enchylaena, R. Brown (1810).

tomentosa, *R. Brown*	F	C	S	W	M	A	N	Y	L	K	.	G

Threlkeldia, R. Brown (1810).

diffusa, *R. Brown*						A				K		

Kochia, Roth (1799).

fimbriolata, *F. v. Mueller*			S	W								
lanosa, *Lindley*	F	C	S	W	M							
lobiflora, *F. v. Mueller*			S	W								
oppositifolia, *R. Brown*				W	.	A	N	Y	L	K	T	
brevifolia, *R. Brown*	F	.	S	W	M	A	N	Y	L			
triptera, *Bentham*	F	C	S		M							
decaptera, *F. v. Mueller*				W								
pentatropis, *Tate*			...	S								
pyramidata, *Bentham*	F			S		M						
eriantha, *F. v. Mueller*... ...	F	C	S	W	.		N					
spongiocarpa, *F. v. Mueller* ...	F											
villosa, *Lindley*	F	C	S	W	M	A		Y			T	
sedifolia, *F. v. Mueller*... ...		C	S	W	M							
aphylla, *R. Brown*	F	C	S	W	M	A						
humillima, *F. v. Mueller* ...		...		...	M			Y				
ciliata, *F. v. Mueller*		C	S	W	M							
brachyptera, *F. v. Mueller* ...		C	S	.	M	.	N					
stelligera, *F. v. Mueller* ...		...		...	M							

Bassia, Allioni (1766).

salsuginosa. *F. v. Mueller*				...	M		N					
enchylaenoides, *F. v. Mueller*... ...				...	.	A	N	Y				
Dallachyana, *Bentham*			S		M							
tricornis, *Bentham*			...	S	.	M						
biflora, *F. v. Mueller*			...	S	.	M	A	N		L		
paradoxa, *F. v. Mueller* ...	F	.	S	W	M		N					
lanicuspis, *F. v. Mueller* ...	F	C	S	W								
diacantha, *F. v. Mueller* ...	F	C	S	W	M	A	N	Y	L			
uniflora, *F. v. Mueller*		C	S	W								
bicornis, *F. v. Mueller*	F	C	S									

eriochiton, *Tate*... ... ... F . S W M
Cornishiana, *F. v. Mueller* ... C
quinquecuspis, *F. v. Mueller* ... F C S . M
echinopsila, *F. v. Mueller* ... ... S . M
divaricata, *F. v. Mueller* ... C S W M
bicuspis, *F. v. Mueller* ... ... C S

Babbagia, F. v. Mueller (1858).

dipterocarpa, *F. v. Mueller* ... F C S
acroptera, *F. v. Mueller & Tate* C S
pentaptera, *F. v. Mueller & Tate* . S

Salicornia, Linne.

robusta, *F. v. Mueller* ... ... M
arbuscula, *R. Brown* ... ... C S W M A N Y L K T G
australis, *Solander* ... ... C S W . A . Y L K T G
tenuis, *Bentham*... ... ... S
leiostachya, *Bentham* ... ... F C

Salsola, Linne (1737).

Kali, *Linne* ... ... F C S W M A N Y L . T G

Suaeda, Forskael (1779).

maritima, *Dumortier* ... ... M A . Y L K . G

AMARANTACEAE.

Euxolus, Rafinesque (1836).

Mitchelli, *F. v. Mueller* ... F C S M

Polycnemon, Linne (1742).

pentandrum, *F. v. Mueller* ... A K T G
diandrum, *F. v. Mueller* ... C W L
mesembrianthemum, *F. v. M.* C

Ptilotus, R. Brown (1810).

obovatus, *F. v. Mueller* ... F C S W M . N
incanus, *Poiret* ... ... F C S
exaltatus, *Nees* ... ... C S W
Beckeri, *F. v. Mueller* ... ... L K
gomphrenoides, *Moquin* L
helipteroides, *F. v. Mueller* ... F .
erubescens, *Schlechtendal* ... ... M A N T
alopecuroideus, *F. v. Mueller*... F C S W M A
nobilis, *F. v. Mueller* ... ... F . S M A N
macrocephalus, *Poiret* ... ... T G
spathulatus, *Poiret* ... ... W M A N Y L . T G
hemisteirus, *F. v. Mueller* ... F W
Schwartzii, *F. v. Mueller* ... F
leucocoma, *Moquin* ... ... F C
parvifolius, *F. v. Mueller* ... C
Hoodii, *F. v. Mueller* ... ... F
Murrayi, *F. v. Mueller*... ... C
latifolius, *R. Brown* ... ... F C

Achyranthes, Linne (1737).

aspera, *Linne* ... ... F

Alternanthera, Forskael (1775).

triandra, *Lamarck* ... ... F C S M A K G
nana, *R. Brown* ... ... F

Gomphrena, Linne (1737).

Brownii, *Moquin* ... ... F

PLUMBAGINEAE.

Plumbago, Linne.

Zeylanica, *Linne* ... ... F

NYCTAGINEAE.

Boerhaavia, Linne.

diffusa, *Linne* ... ... F C S W M A N
repanda, *Willdenow* ... ... C S

URTICACEAE.

Trema, Loureiro.

cannabina, *Loureiro* ... ... F

Ficus, Linne.

platypoda, *Cunningham* ... F
orbicularis, *Cunningham* ... F

Parietaria, Linne.

debilis, *G. Forster* ... ... F C S W M A N Y L K T G

Urtica, Linne.

incisa, *Poiret* ... ... M A K G

CASUARINEAE.

Casuarina, Linne (1737).

quadrivalvis, *Labillardiere* ... ... S W A Y L K T G
glauca, *Sieber* ... ... S M
lepidophloia, *F. v. Mueller* ... ... M
suberosa, *Otto & Dietrich* ... ... T
bicuspidata, *Bentham* L
Decaisneana, *F. v. Mueller* ... F
humilis, *Otto & Dietrich* ... ... W
distyla, *Ventenat* ... ... S A N Y L K T G

LEGUMINOSAE.

Brachysema, R. Brown (1811).

Chambersii, *F. v. Mueller* ... F

Isotropis, Bentham (1837).

atropurpurea, *F. v. Mueller* ... F
Wheeleri, *F. v. Mueller* ... F C
Winneckei, *F. v. Mueller* ... F

Gompholobium, Smith (1798).

minus, *Smith* ... ... A . . L K T G

Burtonia, R. Brown (1811).

polyzyga, *Bentham* ... ... F

Mirbelia, Smith (1805).

oxyclada, *F. v. Mueller* ... F

Sphaerolobium, Smith (1805).

vimineum, *Smith* ... ... A T G

Viminaria, Smith (1804).

denudata, *Smith* ... ... A N T G

Daviesia, Smith (1798).

arthropoda, *F. v. Mueller* ... F
corymbosa, *Smith* ... ... A K
horrida, *Meissner* ... ... N
pectinata, *Lindley* L
ulcina, *Smith* ... ... S A N T G
genistifolia, *Cunningham* ... ... N Y L K T
incrassata, *Smith* ... ... A L K
brevifolia, *Lindley* ... ... A L K T G

Aotus, Smith (1805).

villosa, *Smith* ... ... G

Phyllota, DeCandolle (1825).

pleurandroides, *F. v. Mueller*... ... ... A . K G
Sturtii, *Bentham* ... ... F

Eutaxia, R. Brown (1811).

empetrifolia, *Schlechtendal* ... ... M A N Y L K T G

Dillwynia, Smith (1805).

hispida, *Lindley* ... ... A L G
ericifolia, *Smith*... ... ... A T G
floribunda, *Smith* ... ... A K G
cinerascens, *R. Brown* ... ... G
patula, *F. v. Mueller* ... ... L T

Gastrolobium, R. Brown (1811).

elachistum, *F. v. Mueller* ... ... W
grandiflorum, *F. v. Mueller* ... F

Pultenaea, Smith (1793).

daphnoides, *Wendland*... ... ... A K
stricta, *Sims* ... ... G
mucronata, *F. v. Mueller* ... ... A
scabra, *R. Brown* ... ... K
mollis, *Lindley* L

rigida, *R. Brown*									L	K		
acerosa, *R. Brown*						A			L	K		
vestita, *R. Brown*									L		T	
canaliculata, *F. v. Mueller*						A			L	K		
largiflorens, *F. v. Mueller*						A						
laxiflora, *Bentham*						A						
prostrata, *Bentham*											T	
involucrata, *Bentham*						A				K		G
pedunculata, *Hooker*						A			L			
humilis, *Bentham*												G
graveolens, *Tate*						A						
tenuifolia, *R. Brown*						?		Y	?	K		G
densifolia, *F. v. Mueller*						A			L		T	
villifera, *Sieber*						A			L			
viscidula, *Tate*										K		

Platylobium, Smith (1794).

obtusangulum, *Hooker*						A				K		G
triangulare, *R. Brown*												G

Bossiaea, Ventenat (1800).

prostrata, *R. Brown*						A						G
cinerea, *R. Brown*												G
riparia, *Cunningham*									L			
Battii, *Tate*				W								
Walkeri, *F. v. Mueller*				W								

Templetonia, R. Brown (1812).

retusa, *R. Brown*			S	W			N		L	K		
Muelleri, *Bentham*												G
aculeata, *Bentham*			S									
egena, *Bentham*	F		S	W	M							
sulcata, *Bentham*					M			Y				

Hovea, R. Brown (1812).

longifolia, *R. Brown*							N				T	
heterophylla, *Cunningham*											T	G

Nematophyllum, F. v. Mueller (1857).

Hookeri, *F. v. Mueller*	F											

Goodia, Salisbury (1806).

lotifolia, *Salisbury*						A						G
medicaginea, *F. v. Mueller*				W		A	N	Y	L	K	.	G

Ptychosema, Bentham (1839).

anomalum, *F. v. Mueller*	F											
trifoliolatum, *F. v. Mueller*		C										

Crotalaria, Linne.

linifolia, *Linne*	F											
Mitchelli, *Bentham*	F	C										
Cunninghamii, *R. Brown*	F	C										
dissitiflora, *Bentham*	F	C	S									
medicaginea, *Lamarck*	F											
incana, *Linne*	F											

Æschynomene, Linne (1737).

Indica, *Linne*	F	C									

Glycyrrhiza, Linne.

psoraleoides, *Bentham*					M						

Indigofera, Linne.

linifolia, *Retzius*	F										
monophylla, *DeCandolle*	F										
enneaphylla, *Linne*	F										
viscosa, *Lamarck*	F	C									
hirsuta, *Linne*	F	C									
australis, *Willdenow*	F					A	N				G
brevidens, *Bentham*	F	C									
coronillifolia, *Cunningham*	F										

Tephrosia, Persoon (1807).

purpurea, *Persoon*	F										
sphaerospora, *F. v. Mueller*	F										

Sesbania, Persoon (1807).

aculeata, *Persoon*	F	C			M						

Clianthus, Banks & Solander (1832).

Dampieri, *Cunningham*		C	S	W							

Swainsonia, Salisbury (1806).

Greyana, *Lindley*					M						
coronillifolia, *Salisbury*		C									
colutoides, *F. v. Mueller*				W							
phacoides, *Bentham*	F	C	S		M	A	.	Y			
Burkittii, *F. v. Mueller*				W							
oligophylla, *F. v. Mueller*	F	C									
Burkei, *F. v. Mueller*	F										
oroboides, *F. v. Mueller*	.	C									
campylantha, *F. v. Mueller*		C	S								
procumbens, *F. v. Mueller*		C	.		M	A	N	.			G
stipularis, *F. v. Mueller*		C	S	W	M	A	N				
Oliverii, *F. v. Mueller*				W							
lessertiifolia, *DeCandolle*				W	M	A	N	Y	K	T	G
unifoliolata, *F. v. Mueller*	F										
microphylla, *A. Gray*	F			W	M					T	
laxa, *R. Brown*	F				M			Y			

Lespedeza, A. Richard (1803).

lanata, *Bentham*	F										

Psoralea, Linne (1742).

adscendens, *F. v. Mueller*						A					G
parva, *F. v. Mueller*						A					
patens, *Lindley*	F	C	S	W	M	A	N				G
eriantha, *Bentham*	F		S	.	M						
balsamica, *F. v. Mueller*	F										
leucantha, *F. v. Mueller*	F										

Trigonella, Linne (1737).

suavissima, *Lindley* ... ... F C S

Lotus, Linne (1737).

corniculatus, *Linne* ... ... A G
australis, *Andrews* ... ... F C S W M A N Y L K T G

Kennedya, Ventenat (1804).

monophylla, *Ventenat* ... ... A Y L K
prostrata, *R. Brown* ... ... A Y L K T G
prorepens, *F. v. Mueller* ... F

Glycine, Linne (1737).

clandestina, *Wendland*... ... F S W M A N Y ? G
Latrobeana, *Bentham* ... ... A G
falcata, *Bentham* C
tabacina, *Bentham* ... ... C S W N
sericea, *Bentham* ... ... F C M
tomentosa, *Bentham* C

Erythrina, Linne (1737).

vespertilio, *Bentham* ... ... F

Rhynchosia, Loureiro (1790).

minima, *DeCandolle* ... ... F . S

Galactia, P. Browne (1756).

tenuiflora, *Wight & Arnott* ... F

Vigna, Savi (1824).

lanceolata, Bentham ... ... F C

Cassia, Linne.

Sophera, *Linne* ... ... F C S
venusta, *F. v. Mueller* ... ... F
notabilis, *F. v. Mueller* ... F
pleurocarpa, *F. v. Mueller* ... F C
glutinosa, *DeCandolle* ... ... F
pruinosa, *F. v. Mueller* ... C
desolata, *F. v. Mueller*... ... F C S
Sturtii, *R. Brown* ... ... C S W M Y
artemisioides, *Gaud.* ... ... F S W
eremophila, *Cunningham* ... F C S W M A N Y L .
circinata, *Bentham* ... ... M
phyllodinea, *R. Brown*... ... F C S W M A N T

Petalostylis, R. Brown (1849).

labicheoides, *R. Brown* ... F C S

Bauhinia, Linne.

Leichhardtii, *F. v. Mueller* ... F
Carronii, *F. v. Mueller*... C

Neptunia, Loureiro (1790).

monosperma, *F. v. Mueller* ... F
gracilis, *F. v. Mueller* ... ... F

Acacia, Willdenow.

continua, *Bentham* ... ... W . A N
Peuce, *F. v. Mueller* C
spinescens, *Bentham* ... ... M A . Y L K
colletioides, *Cunningham* ... ... W M
genistioides, *Cunningham* ... ... W
rupicola, *F. v. Mueller* ... ... A N . L K
tetragonophylla, *F. v. Mueller* F C S W M
spondylophylla, *F. v. Mueller*... F
lycopodifolia, *Cunningham* ... F
minutifolia, *F. v. Mueller* ... F
calamifolia, *Sweet* ... ... S W M A N K
scirpifolia, *Meissner* ... ... F W
juncifolia, *Bentham* ... ... F
rigens, *Cunningham* ... ... A . Y L . T
gonophylla, *Bentham* ... ... W
sessiliceps, *F. v. Mueller* ... F
papyrocarpa, *Bentham* ... ... W
Gilesiana, *F. v. Mueller* ... ... W
armata, *R. Brown* ... ... M A N L K T
strongylophylla, *F. v. Mueller* F
Sentis, *F. v. Mueller* ... ... F C S
aspera, *Lindley* ... ... M
acanthoclada, *F. v. Mueller* ... ... W
vomeriformis, *Cunningham* ... ... A T
erinacea, *Bentham* ... ... W
obliqua, *Cunningham* ... ... M A N
lineata, *Cunningham* L
sublanata, *Bentham* ... ... S W N
pravifolia, *F. v. Mueller* ... ... S N
acinacea, *Lindley* ... ... A N Y L
anceps, *DeCandolle* L
dodonaeifolia, *Willdenow* ... ... L K T .
microcarpa, *F. v. Mueller* ... ... M . . Y L K
brachybotrya, *Bentham* ... ... M A N Y . K T
Spilleriana, *J. E. Brown* ... ... A
suaveolens, *Willdenow* ... ... G
iteaphylla, *F. v. Mueller* ... ... S
Murrayana, *F. v. Mueller* ... C
notabilis, *F. v. Mueller* ... ... W M A N Y L K
retinodes, *Schlechtendal* ... ... A N L K G
Wattsiana, *F. v. Mueller* ... ... N
pycnantha, *Bentham* ... ... S A N L K G
hakeoides, *Cunningham* ... ... S M Y
salicina, *Lindley* ... ... F . W M A N Y L K
pyrifolia, *DeCandolle* ... ... F
myrtifolia, *Willdenow* ... ... A L K T G
verniciflua, *Cunningham* ... ... A
montana, *Bentham* ... ... M A T
impressa, *F. v. Mueller* ... F
estrophiolata, *F. v. Mueller* ... F
craspedocarpa, *F. v. Mueller* ... C
cochlearis, *Wendland* ... ... W L
dictyophleba, *F. v. Mueller* ... F
retivenea, *F. v. Mueller* ... F
trineura, *F. v. Mueller*... ... ... M
cyclopis, *Cunningham* ... ... W

melanoxylon, *R. Brown*	...	...	...	...	A	N					T	G
homalophylla, *Cunningham*	...	...	S	W	M							
stenophylla, *Cunningham*	...	C			M							
Osswaldi, *F. v. Mueller*	...	C		W	M	.		Y				
coriacea, *DeCandolle* ...	...	C										
sclerophylla, *Lindley* ...	...	...		...	M			Y	L		T	
farinosa, *Lindley* ...	...	...		...	M					K		
Whanii, *F. v. Mueller* ...	...	...		...	M					K		
lanigera, *Cunningham* ...	...	...		...	...		...	Y				
verticillata, *Willdenow*...	...	...		...	...	A	N			K	.	G
oxycedrus, *Sieber* ...	...	...		...	...		...		...		...	G
rhigiophylla, *F. v. Mueller*	...	...		...	M							
stipuligera, *F. v. Mueller*	...	F										
lysiphloia, *F v Mueller*	...	F										
longifolia, *Willdenow* ...	...	...		...	...	A	.	Y	L	K	T	G
Kempeana, *F. v. Mueller*	...	F										
acradenia, *F. v. Mueller*	...	F										
doratoxylon, *Cunningham*	...	F	C									
aneura, *F. v. Mueller* ...	...	F	C	S	W							
cibaria, *F. v. Mueller* ...	...	F										
cyperophylla, *F. v. Mueller*	...	F	C		.							
Burkitti, *F. v. Mueller* ...	...	...		.	W							
Farnesiana, *Willdenow* ...	...	F	C									
Mitchelli, *Bentham* ...	...		.									G
mollissima, *Willdenow* ...	...	...		...	...		...		...		T	G
dealbata, *Link*	...	...		...	...		...		...		T	G

THYMELEAE.

Pimelea, Banks & Solander (1788).

trichostachya, *Lindley* ...	...	F	C										
curviflora, *R. Brown* ...	...		...		W	M	A	N	Y		K		
simplex, *F. v. Mueller* ...	...	F	C	S	W								
phylicoides, *Meissner* ...	...		...		W		A		Y		K		G
octophylla, *R. Brown* ...	...		...		...	M	A	N	Y	L	K		G
petraea, *Meissner* ...	...		...	S	W								
glauca, *R. Brown* ...	...		...		...	M	A	N	Y	L	K	T	G
ligustrina, *Labillardiere*	...		...		...	...	A				K		G
stricta, *Meissner* ...	...		...		...	...	A				K		
spathulata, *Labillardiere*	...		...		...	...	A	N			K		
humilis, *R. Brown* ...	...		...		...	...	A					T	G
microcephala, *R. Brown*	...	F	C	S	W	M				L	K		
serpyllifolia, *R. Brown*	...		...		...	M	A		Y	L	K	.	G
elachantha, *F. v. Mueller*	...		..		...	...		...		...		T	G
flava, *R. Brown*	...		...		...	M	A			L	K		
petrophila, *F. v. Mueller*	...		...	S				N					
ammocharis, *F. v. Mueller*	...	F											

PROTEACEAE.

Petrophila, R. Brown (1809).

multisecta, *F. v. Mueller*	...	...	...	...	...	...	K						

Isopogon, R. Brown (1809).

ceratophyllus, *R. Brown*	...	...	...	...	A					K	T	G

Adenanthos, Labillardiere (1804).

sericea, *Labillardiere*												K		
terminalis, *R. Brown*						A					L	K		G

Conospermum, Smith (1798).

patens, *Schlechtendal*						A					L	K	T	G
Mitchellii, *Meissner*													...	G

Persoonia, Smith (1798).

juniperina, *Labillardiere*						A							T	

Grevillea, R. Brown (1809).

Huegelii, *Meissner*				W	M	A	N	Y	L					G
Treueriana, *F. v. Mueller* ...	F			W										
ilicifolia, *R. Brown*					M	A	N	Y	L	K	T			
aquifolium, *Lindley*											T			
angulata, *R. Brown*	F													
Wickhami, *Meissner*	F													
agrifolia, *Cunningham*	F													
pterosperma, *F. v. Mueller* ...	F	C		W	M									
stenobotrya, *F. v. Mueller* ...	F													
juncifolia, *Hooker*	F	C		W										
halmaturina, *Tate*									L	K				G
nematophylla, *F. v. Mueller* ...		C	S	W										
striata, *R. Brown*	F	C												
lavandulacea, *Schlechtendal*						A	N		L	K	T			G
aspera, *R. Brown*				W					L	K				
pauciflora *R. Brown*									L	K				

Hakea, Schrader (1797).

chordophylla, *F. v. Mueller* ...	F													
lorea, *R. Brown*	F													
macrocarpa, *Cunningham* ...	F													
multilineata, *Meissner*	F			W										
Baxteri, *R. Brown*				W										
Ednieana, *Tate*			S											
purpurea, *Hooker*	F				M									
vittata, *R. Brown*						A			L		T			
nodosa, *R. Brown*													...	G
cycloptera, *R. Brown*									L					
leucoptera, *R. Brown*	F	C	S		M			Y						
rostrata, *F. v. Mueller*						A				K				G
rugosa, *R. Brown*						A	N	Y	L	K	T			G
ulicina, *R. Brown*						A		Y		K	T			G
nitida, *R. Brown*				W										

Banksia, Linne fils (1781).

marginata, *Cavanilles*						A	N		L	K	T			G
ornata, *F. v. Mueller*						A				K	T			G

SAXIFRAGEAE.

Bauera, Banks (1793).

rubioides, *Andrews*						A				K				

CRASSULACEAE.

Tillaea, Linne.

verticillaris, *De Candolle* ... C S W M A N Y L K T G
purpurata, *Hooker* ... ...A N Y G
recurva, *Hooker*... ... ... M A K G
macrantha, *Hook.* ... ... M A Y L K G

ROSACEAE.

Geum, Linne (1737).

urbanum, *Linne* ... ... G

Potentilla, Linne (1737).

anserina, *Linne* ... ...A G

Rubus, Linne.

parvifolius, *Linne* ... ...A K G

Acaena, Linne (1771).

ovina, *Cunningham* ... ...A N Y L K T G
Sanguisorbae, *Vahl* ... ...A K G

Stylobasium, Desfontaines (1819).

spathulatum, *Desfontaines* ... F

FICOIDEAE.

Mesembrianthemum, Linne (1737).

aequilaterale, *Haworth* ... F . S W M A N Y L K T G
australe, *Solander* ... ... W M A N Y L K T

Tetragonia, Linne (1737).

expansa, *Murray* ... ... C S W M N
implexicoma, *Hook.* ... ...A N Y L K T G

Gunnia, F. v. Mueller (1858).

septifraga, *F. v. Mueller* ... C

Aizoon, Linne (1737).

quadrifidum, *F. v. Mueller* ... C S W
zygophylloides, *F. v. Mueller*... C S

Trianthema, Linne.

turgidifolia, *F. v. Mueller* ... F
crystallina, *Vahl* ... ... C S M
pilosa, *F. v. Mueller* ... ... F C
humillima, *F. v. Mueller* ... ... Y

Zaleya, Burmann (1768).

decandra, *Burmann* ... ... C W

Mollugo, Linne (1737).

hirta, *Thunberg* ... ... F C S M
orygioides, *F. v. Mueller* ... C
Spergula, *Linne* ... ... M
Cerviana, *Seringe* ... ... F . W M

LYTHRARIEAE.

Lythrum, Linne (1737).

Salicaria, *Linne* ... ... A G
hyssopifolia, *Linne* ... ... F C A G

Rotala, Linne (1771).

diandra, *F v. Mueller* ... ... F
verticillaris, *Linne* ... ... F

Ammannia, Linne (1737).

baccifera, *Linne*... C
multiflora, *Roxburgh* ... ... F M

ONAGREAE.

Epilobium, Linne (1737).

glabellum, *G. Forster* ... ... S A N L K G

Jussieua, Linne (1737).

diffusa, *Forskael*... ... ... M A G

MYRTACEAE.

Darwinia, Rudge (1813).

micropetala, *Bentham* ... ... W . K
Schuermanni, *Bentham*... L

Verticordia, DeCandolle (1813).

Wilhelmii, *F. v. Mueller* L

Calycothrix, Labillardiere (1806).

longiflora, *F. v. Mueller* ... F
tetragona, *Labillardiere* ... ... A N Y L K T G

Lhotzkya, Schauer (1835).

glaberrima, *F. v. Mueller* ... ... K
genetylloides, *F. v. Mueller* ... ... T G
Smeatoniana, *F. v. Mueller* ... ... K

Thryptomene, Endlicher (1838).

Maisonneuvii, *F. v. Mueller* ... F
flaviflora, *F. v. Mueller*... ... F
Mitchelliana, *F. v. Mueller* ... ... M T
auriculata, *F. v. Mueller* ... ... W
Elliottii, *F. v. Mueller* ... ... W
ericaea, *F. v. Mueller* ... ... K
Miqueliana, *F. v. Mueller* ... ... Y L
ciliata, *F v. Mueller* ... ... K T G

Baeckea, Linne (1753).

diffusa, *Sieber*						A				K		
crassifolia, *Lindley*							...	Y	L	K	T	G
ericaea, *F. v. Mueller*							...		...		T	
polystemona, *F. v. Mueller* ...	F											
Behrii, *F. v. Mueller*				W					L		T	

Leptospermum, R. & G. Forster (1776).

laevigatum, *F. v. Mueller*				W	M			Y		K	T	
scoparium, *Forster*						A	N			K		G
lanigerum, *Smith*						A				K		G
myrsinoides, *Schlechtendal*						A				K	T	G

Kunzea, Reichenbach (1828).

pomifera, *F. v. Mueller*						A				K	T	G

Callistemon, R. Brown (1814).

coccineus, *F. v. Mueller*						A	N	Y	L	K	T	G
salignus, *DeCandolle*						A					T	
teretifolius, *F. v. Mueller*			S			A						
brachyandrus, *Lindley*...					M						T	

Melaleuca, Linne (1767).

squamea, *Labillardiere*...							...		...	K		G
Wilsonii, *F. v Mueller*							...		L		T	G
gibbosa, *Labillardiere*							...		...	K		G
decussata, *R. Brown*						A			L	K	T	G
squarrosa, *Smith*							...		...	K	T	G
glomerata, *F. v. Mueller* ...	F	C	S									
trichostachya, *Lindley*... ...		C										
parviflora, *Lindley* ...	F		S	W	M	A	N	Y	L	K	T	G
cylindrica, *R. Brown*							...		...	K		
acuminata, *F. v. Mueller*					M	A		Y	L	K	T	
quadrifaria, *F. v. Mueller*				W								
uncinata, *R. Brown*				W	M	A	N	Y	L	K	T	
ericifolia, *Smith*...							...		...		...	G
pustulata, *Hooker*						A		Y	L	K	T	G

Eucalyptus, L'Heritier (1788).

corynocalyx, *F. v. Mueller*							N		L	K		
gamophylla, *F. v. Mueller* ...	F											
tessellaris, *F. v. Mueller* ...	F											
incrassata, *Labillardiere*			S	W	M	A	N	Y	L	K	T	G
hemiphloia, *F. v. Mueller*							N		L	K	T	
gracilis, *F. v. Mueller*					M	A	N	Y		K	T	
odorata, *F. v. Mueller*						A	N	Y		K	T	G
pauciflora, *Sieber*							...		...		...	G
amygdalina, *Labillardiere*							...		...		...	G
obliqua, *L'Heritier*						A				K		G
Sieberiana, *F. v. Mueller*							...		...	K		G
paniculata, *Smith*						A				K		G
largiflorens, *F. v. Mueller*					M					K	T	
Behriana, *F. v. Mueller*							N		L	K	T	
oleosa, *F. v. Mueller*			S				N	Y			T	
terminalis, *F. v. Mueller* ...	F											
setosa, *Schauer*	F											

goniocalyx, *F. v. Mueller*	...	...	...	...	A	N			K				
leucoxylon, *F. v. Mueller*	...	...	...	...	A	N		L	K	T	G		
uncinata, *Turczaninow* ...	...	...	...	M	A		Y		K	T			
cneorifolia, *DeCandolle* ...	...	...	...	...		...		L	K				
microtheca, *F. v. Mueller*	...	F	C										
Stuartiana, *F. v. Mueller*	...	...	...	...		...		...		...	G		
viminalis, *Labillardiere*	...	...	...	...	A			L	K		G		
rostrata, *Schlechtendal* ...	...	F	C	S	W	M	A	N		L	K	T	G
Gunnii, *Hooker*	...	...	...	...	A						G		
cosmophylla, *F. v. Mueller*	...	...	...	...	A			L	K				
santalifolia, *F. v. Mueller*	...	...	...	...	A			L	K		G		
capitellata, *Smith*	...	...	...	...	A				K	T	G		
macrorrhyncha, *F. v. Mueller* ...	...	...	...	...	A								
Oldfieldii, *F. v. Mueller*	...	F											
pachyphylla, *F. v. Mueller*	...	F											
pyriformis, *Turczaninow*	...	F		W									

RHAMNACEAE.

Ventilago, Gaertner (1788).

viminalis. *Hooker*	...	...	F

Pomaderris, Labillardiere (1804).

myrtilloides, *Fenzl*	...	...		W									
apetala, *Labillardiere* ..	...	...	...	...		N					G		
racemosa, *Hooker*	...	...	...	...	A	N	Y	L	K		G		
obcordata, *Fenzl* ...	...	...	...	...		N	Y	L	K		G		

Cryptandra, Smith (1798).

Wayii, *F. v. Mueller & Tate* ...	...	...	...	A	N								
Hookeri, *F. v. Mueller* ...	...	...	...	A						G			
phlebophylla, *F. v. Mueller*	...	...	S										
spathulata, *F. v. Mueller*	...	F			A			L	K		G		
coactilifolia, *F. v. Mueller*	...	...	...	A									
leucophracta, *Schlechtendal*	...	...	W	M			Y	L	K				
obovata, *Hooker* ...	...	...	...	A					K				
vexillifera, *Hooker* ...	...	...	...	A			Y	L	K	T	G		
subochreata, *F. v. Mueller*	...	...	...	M	A			L		T	G		
halmaturina, *F. v. Mueller*	...	...	...	A					K				
bifida, *F. v. Mueller* ...	...	...	...	...		...		L					
scabrida, *Tate*	...	...	...	...		...		...	K				
Waterhousei, *F. v. Mueller*	...	...	...	...		...		...	K				
hispidula, *Reisseck* ...	...	...	...	A					K	T			
propinqua, *Cunningham*	...	...	...	M									
amara, *Smith*	...	...	W		A								
tomentosa, *Lindley* ...	...	...	W	M	A		Y	L					

OLACINEAE.

Olax, Linne (1747).

Benthamiana, *Miquel* ...	...	...	...	...		...		L	K				

SANTALACEAE.

Santalum, Linne (1742).

lanceolatum, *R. Brown* ...	...	F	C	S									
acuminatum, *DeCandolle*	...	F		S	W	M	A	N	Y	L	K		
persicarium, *F. v. Mueller*	...	...		S		M	A	N	Y			T	

Choretrum, R. Brown (1810).

glomeratum, *R. Brown*...	...	...	...	...	A			Y	L	K	T			
chrysanthum, *F. v. Mueller*	...	...	...	...	A			Y						
spicatum, *F. v. Mueller*	...	...	...	M						K	T			

Leptomeria, R. Brown (1810).

aphylla, *R. Brown*	...	...	...	...	M	A	N		L	K		G		

Anthobolus, R. Brown (1810).

exocarpoides, *F. v. Mueller*	...	F												

Exocarpos, Labillardiere (1798).

cupressiformis, *Labillardiere* ...	...	...	M	A			Y	L	K	T	G			
spartea, *R. Brown*	...	...	F			M	A		Y	L				
aphylla, *R. Brown*	...	...	...	S	W	M	A	N	Y	L				
stricta, *R. Brown*	...	...	...	...		M				L		T	G	

HALORAGEAE.

Loudonia, Lindley (1839).

Behrii, *Schlechtendal*	...	...	...	...	...	A			Y	L	K	T		
aurea, *Lindley* ...	...	...	...	S	W						K			

Haloragis, R. & G. Forster (1776).

Meionectes, *F. v. Mueller*	...	...	...	...	A								G	
heterophylla, *Brongniart*	...	C	S		M	A	N	Y	L				G	
digyna, *Labillardiere* ...	...	...		W	M	A				K			G	
elata, *Cunningham*	...	...	...	W		A				K				
aspera, *Lindley* ...	...	F	C	S	W	M	A	N	Y				G	
acutangula, *F. v. Mueller*	...	...	...		...		...		L					
odontocarpa, *F. v. Mueller*	...	...		W	M									
trigonocarpa, *F. v. Mueller*	...	F												
Gossei, *F. v. Mueller* ...	...	F												
micrantha, *R. Brown* ...	...	...	...	,,	...	A							G	
tetragyna, *R. Brown* ...	...	...	...	...	...	A	N	Y	L	K	T	G		
teucrioides, *A. Gray* ...	...	...	...	...	...	A	N	Y	L	K		G		

Myriophyllum, Linne (1767).

integrifolium, *Hooker* ...	...	...	...	M	A						T	G		
amphibium, *Labillardiere*	...	...	...	...	A							G		
pedunculatum, *Hooker*...	...	...	...	...		...		...		...	G			
verrucosum, *Lindley* ...	...	F		M	A			L				G		
Muelleri, *Sonder*	...	...	...	...	A			L	K					
intermedium, *DeCandolle*	...	...	...	M	A				K		G			
elatinoides, *Gaudichaud*	...	...	...	M	A				K	T	G			

Callitriche, Linne (1748).

verna, *Linne*	...	...	...	...	...	M	A				T			

UMBELLIFERAE.

Actinotus, Labillardiere (1804).

Schwarzii, *F. v. Mueller*	...	F												

Hydrocotyle, Linne.

vulgaris, *Linne*	...	...	...	S		M	A	N				T	G
Asiatica, *Linne*		...	...	S		M	A				K		G
Candollei, *F. v. Mueller*		...	...	S			A	N			K	T	G
hirta, *R. Brown*... ...		...	...		...		A			L	K		G
pterocarpa, *F. v. Mueller*		...	...		...		...		...	...		...	G
comocarpa, *F. v. Mueller*		...	...		...		...		...	...	K		
tripartita, *R. Brown* ...		...	...		...		...		...	...	K		G
callicarpa, *Bunge* ...		...	...	S		M	A	N	Y	L	K	T	G
trachycarpa, *F. v. Mueller*		...	F	S									
crassiuscula, *Tate* ...		...	...		...		...		...	...	K		
capillaris, *F. v. Mueller*		...	...		W		A		Y	L	K		G
medicaginoides, *Turcz.*		...	...		...		...	...	Y				
diantha, *DeCandolle* ...		...	...		...		...		...	...	K		

Didiscus, DeCandolle (1828).

pusillus, *F. v. Mueller* ...		...	...		...		A		Y	L	K		
cyanopetalus, *F. v. Mueller*	...	F				M			Y	L			
eriocarpus, *F. v. Mueller*		...	...	S	W				Y	L			
pilosus, *Bentham* ...		...	...		...		...		...	...		...	G
glaucifolius, *F. v. Mueller*	...	F	C	S									

Trachymene, Rudge (1810).

heterophylla, *F. v. Mueller*	...	...	...		...		A			L	K		

Xanthosia, Rudge (1810).

pusilla, *Bunge* ...	...	...	...	...	...		...	A		Y			
dissecta, *Hooker*	...	...	...	...	...		...	A			L	K	T	G

Eryngium, Linne.

rostratum, *Cavan.* ...	...	...	...	...	...		...	A				T	G
vesiculosum, *Labillardiere*	...	...	...	...	...		...	A			K		G
plantagineum, *F. v. Mueller*	...	C											

Crantzia, Nuttall (1818).

lineata, *Nuttall*...	...	...	...	...	...	M	A				K		G

Caldasia, Lagasca (1821).

andicola, *Lagasca*	...	...	...	...	...	...	...	...	...	...		...	G

Apium, Linne.

prostratum, *Labillardiere*	...	...	...	M	A	N	Y	L	K	T	G
latifolium, *Linne*	...	...	...	...	...	A

Sium, Linne.

Daucus, Linne.

brachiatus, *Sieber*	...	...	F	C	S	W	M	A	N	Y	L	K	T	G

CUCURBITACEAE.

Cucumis, Linne.

Chate, *Linne* ...	...	...	F		M		

Momordica, Linne.

Charantia, *Linne* ... ... F

Melothria, Linne.

Muelleri, *Bentham* ... ... M
Maderaspatana, *Cogniaux* ... F S

LORANTHACEAE.

Loranthus, Linne (1740).

celastroides, *Sieber* ... ... G
angustifolius, *R. Brown* L
Exocarpi, *Behr* ... ... F C S W A Y
linearifolius, *Hooker* ... ... S
Murrayi, *Tate* ... ... S
linophyllus, *Fenzl* ... ... F C W M A Y
gibberulus, *Tate* ... ... F C
pendulus, *Sieber*... ... ... F C W A Y L G
Quandang, *Lindley* ... ... F C S
grandibracteus, *F. v. Mueller*... C

Viscum, Linne.

articulatum, *Burm.* C

RUBIACEAE.

Oldenlandia, Linne.

tillaeacea, *F. v. Mueller* ... F C S

Dentella, Forster (1776).

repens, *Forster* ... ... F C

Canthium, Lamarck (1783).

latifolium, *F. v. Mueller* ... F

Coprosma, Forster (1776).

hirtella, *Labillardiere* ... ... G

Opercularia, Gaertner (1788).

ovata, *J. Hooker* ... ... A G
varia, *J. Hooker* ... ... A Y K G
scabrida, *Schlechtendal*... ... ... A L

Pomax, Solander (1788).

umbellata, *Solander* ... ... F S W N

Spermacoce, Linne.

marginata, *Bentham* ... ... F

Asperula, Linne.

geminifolia, *F. v. Mueller* ... ... M T
oligantha, *F. v. Mueller* ... ... S M A N Y K T G

Galium, Linne.

umbrosum, *Solander* ... ... W M A N Y L K T G
australe, *DeCandolle* ... ... S M A N Y K T G

CAPRIFOLIACEAE.

Sambucus, Linne.

Gaudichaudiana, *DeCandolle* ... ... G

COMPOSITAE.

Siegesbeckia, Linne (1737).

orientalis, *Linne* ... ... F W A N G

Wedelia, Jacquin (1763).

platyglossa, *F. v. Mueller* ... C M A T
verbesinoides, *F. v. Mueller* ... F

Bidens, Linne (1753).

bipinnata, *Linne* ... ... F

Glossogyne, Cassini (1827).

tenuifolia, *Cassini* ... ... F S

Flaveria, Jussieu (1789).

Australasica, *Hooker* C

Aster, Linne.

Sonderi, *F. v. Mueller* ... ... A
pannosus, *F. v. Mueller* ... ... A N Y L T G
pimeloides, *Cunningham* ... ... S W M N
myrsinoides, *Labillardiere* ... ... G
Mitchelli, *F. v. Mueller* ... F M Y
tubuliflorus, *F. v. Mueller* ... ... A K T
axillaris, *F. v. Mueller* ... ... A N Y L K T G
microphyllus, *Ventenat* ... ... G
ramulosus, *Labillardiere* ... ... W M A Y L K G
exiguifolius, *F. v. Mueller* ... ... W
lepidophyllus, *Persoon* ... ... A Y T
stellulatus, *Labillardiere* ... ... G
asterotrichus, *F. v. Mueller* ... ... G
magniflorus, *F. v. Mueller* ... ... W M
calcareus, *F. v. Mueller* ... ... S W M
Muelleri, *Sonder* ... ... C W M Y T
Stuartii, *F. v. Mueller* ... ... W
decurrens, *Cunningham* ... ... M Y L
glutescens, *F. v. Mueller* ... ... S M A Y T G
teretifolius, *F. v. Mueller* ... ... M A Y K G
glandulosus, *Labillardiere* ... G
megalodontus, *F. v. Mueller* ... F
Ferresii, *F. v. Mueller* ... F
exul, *Lindley* .. .. W M A N Y L K G
Huegelii, *F. v. Mueller* ... ... W A Y L K T G

Podocoma, Cassini (1817).

cuneifolia, *R. Brown* ... ... F C S

Vittadinia, Richard (1832).

australis, *Richard* ... ... F S W M A N Y L K T G

Dimorphocoma, F. v. Mueller & Tate (1883).

minutula, *F. v. Mueller & Tate* S

Minuria, DeCandolle (1836).

leptophylla, *DeCandolle* ... F C S W M A N Y L T
Cunninghamii, *Bentham* ... F C S M Y
integerrima, *Bentham* ... ... C S M
denticulata, *Bentham* ... ... F C S M
suaedifolia, *F. v. Mueller* ... C W N Y L T

Achnophora, F. v. Mueller (1883).

Tatei, *F. v. Mueller* ... ... K

Calotis, R. Brown (1820).

cuneifolia, *R. Brown* ... ... M A N
hispidula, *F. v. Mueller* ... F C S W M N Y
cymbacantha, *F. v. Mueller* ... F C S W N
erinacea, *Steetz* ... ... C S M A Y L
scabiosifolia, *Sonder & F. v. M.* ... S A
scapigera, *Hooker* ... ... M
lappulacea, *Bentham* ... ... F C S
microcephala, *Bentham*... ... F
plumulifera, *F. v. Mueller* ... C S
porphyroglossa, *F. v. Mueller*... F C
Kempei, *F. v. Mueller* ... ... F

Lagenophora, Cassini (1818).

Billardieri, *Cassini* ... ... A L K G
Huegelii, *Bentham* ... ... A N Y L G

Brachycome, Cassini (1816).

goniocarpa, *Sonder & F. v. M.* ... ... M N L
pachyptera, *Turczaninow* ... C S W M A N Y
collina, *Bentham* ... ... A N Y L
Muelleri, *Sonder* ... ... A L T G
graminea, *F. v. Mueller* ... ... W M A G
basaltica, *F. v. Mueller* ... ... A
trachycarpa, *F. v. Mueller* ... ... S W A N G
diversifolia, *Fischer & Meyer* ... ... A G
ciliaris, *Lessing* ... ... F C S W M A N Y L T
debilis, *Sonder* ... ... A L
chrysoglossa, *F. v. Mueller* ... ... M
calocarpa, *F. v. Mueller* ... ... S M A
exilis, *Sonder* ... ... M A N L
melanocarpa, *Sonder & F. v. M.* C W M
cardiocarpa, *F. v. Mueller* ... ... G
cuneifolia, *Tate* ... ... L K
decipiens, *Hooker* ... ... G

Erodiophyllum, F. v. Mueller (1875).

Elderi, *F. v. Mueller* ... ... C W

Cymbonotus, Cassini (1825).

Lawsonianus, *Gaudichaud* ... ... A N Y L K G

Solenogyne, Cassini.

emphysopus, *F. v. Mueller* ... ...A K T G

Isoetopsis, Turczaninow (1851).

graminifolia, *Turczaninow* ... ... S M A N Y L K T

Toxanthus, Turczaninow (1851).

perpusillus, *Turczaninow* ... ... M N Y
Muelleri, *Bentham* ... ... M A L K

Quinetia, Cassini (1830).

Urvillei, *Cassini* ... ...A L

Millotia, Cassini (1829).

tenuifolia, *Cassini* ... ... S W M A N Y L K T G
Greevesii, *F. v. Mueller* ... C S M
Kempei, *F. v. Mueller* ... ... F S W

Erechthites, Rafinesque (1817).

prenanthoides, *DeCandolle* ... ... G
picridioides, *Turczaninow* ... F N Y K T
arguta, *DeCandolle* ... ... S A K T G
mixta, *DeCandolle* ... ... M L
quadridentata, *DeCandolle* ... ... M A N Y L K G
hispidula, *DeCandolle* ... ... M A Y L T G

Senecio, Linne.

Gregorii, *F. v. Mueller*... ... F C S W M
platylepis, *DeCandolle*... ... ... M
spathulatus, *Richard* ... ... G
megaglossus, *F. v. Mueller* ... ... N
magnificus, *F. v. Mueller* ... F S
lautus, *Solander*... ... ... F C S W M A N Y L K G
Behrianus, *Sonder & F. v.M.* ... ... M
dryadeus, *Sieber*... ... ... G
anethifolius, *Cunningham* ... ... S N
odoratus, *Hornemann* ... ... F A N L K G
hypoleucus, *Bentham* ... ...A
Cunninghamii, *DeCandolle* ... C S W M A N Y K
Georgianus, *DeCandolle* ... ...A K
brachyglossus, *F. v. Mueller* ... C S W M A N Y

Cotula, Linne (1735).

filifolia, *Thunberg* ... ... M A N L K T G
coronopifolia, *Linne* ... ... C S M A N L K T G
australis, *Hooker* ... ... M A N L K T G
reptans, *Bentham* ... ... G

Centipeda, Loureiro (1790).

orbicularis, *Loureiro* ... ... C M
Cunninghamii, *F. v. Mueller* ... F C M A N Y L K T G
thespidioides, *F. v. Mueller* ... F C S M

Ceratogyne, Turczaninow (1851).

obionoides, *Turczaninow* ... ... S

Ethuliopsis, F. v. Mueller (1861).

Cunninghamii, *F. v. Mueller* ... C S M

Epaltes, Cassini (1818).

australis, *Lessing* ... ... F C M
Tatei, *F. v. Mueller* ... ... L T

Stuartina, Sonder (1852).

Muelleri, *Sonder* ... ... S M A N Y L K T G

Humea, Smith (1804).

squamata, *F. v. Mueller* ... ... M T
cassiniacea, *F. v. Mueller* L

Ixodia, R. Brown (1812).

achilleoides, *R. Brown* ... ... A L K G

Elachanthus, F. v. Mueller (1852).

pusillus, *F. v. Mueller* ... ... S W M Y

Rutidosis, DeCandolle (1837).

helichrysoides, *DeCandolle* ... F C S
Pumilo, *Bentham* ... ... A Y L F

Pluchea, Cassini (1817),

conocephala, *F. v. Mueller* ... ... W M N
tetranthera, *F. v. Mueller* ... F
Eyrea, *F. v. Mueller* ... ... F C S N

Pterigeron, DeCandolle (1836).

liatroides, *Bentham* ... ... C S W
microglossus, *Bentham* ... ... F
adscendens, *Bentham* ... ... F
dentatifolius, *F. v. Mueller* ... F

Podosperma, Labillardiere (1806).

angustifolium, *Labillardiere* ... ... M A N Y L K T G

Ixiolaena, Bentham (1837).

leptolepis, *Bentham* ... ... C S M
supina, *F. v. Mueller* ... ... A L K
tomentosa, *Sonder & F. v. M.* ... F C W S M N L

Athrixia, Ker (1823).

tenella, *Bentham* ... ... S M N Y L T

Cassinia, R. Brown (1817).

aculeata, *R. Brown* ... ... M Y G
arcuata, *R. Brown* ... ... M A Y
laevis, *R. Brown* ... ... S W
punctulata, *F. v. M. & Tate* ... ... N Y L K T
spectabilis, *R. Brown* ... ... Y K

Podolepis, Labillardiere (1806).

rutidochlamys, *F. v. Mueller* ...		C										
canescens, *Cunningham* ...	F	C	S	W	M	A	N	Y	L		T	
acuminata, *R. Brown*		...		...		... A		Y				G
rugata, *Labillardiere*		...		...		... A		Y	L	K	T	G
Lessoni, *Bentham*		...	S			A						
Siemssenia, *F. v. Mueller* ...		C	S	W	M		N					

Gnaphalium, Linne (1737).

luteo-album, *Linne*	F	C	S		M	A	N	Y	L	K	T	G
Indicum, *Linne*	F											
Japonicum, *Thunberg*	F		S		M	A	N	Y	L	K	T	G
indutum, *Hooker*		...		...	M	A	N	Y	L	K		G

Leptorrhynchos, Lessing (1832).

tenuifolius, *F. v. Mueller* ...		...		...		...		...		...		G
squamatus, *Lessing*		...	S		M	A	N	Y	L		T	G
pulchellus, *F. v. Mueller* ...		C		W	M	A	N	Y	L		T	G
elongatus, *DeCandolle*		...		...		... A	N	Y			T	G
medius, *Cunningham*		...		...	M	A	N	Y	L		T	G
Waitzia, *Sonder*		...		W	M	A	N	Y	L			

Helipterum, DeCandolle (1837).

roseum, *Bentham*		...		W							
anthemoides, *DeCandolle* ...		...		...		... A	N				T	
polygalifolium, *DeCandolle* ...		...	S	W	M				L			
strictum, *Bentham*		C	S	W								
hyalospermum, *F. v. Mueller* ...		C	S	W	M	A	N	Y	L			
floribundum, *DeCandolle* ...	F	C	S	W	M		N	Y				
heteranthum, *Turczaninow* ...		...		...		...	...	Y				
tenellum, *Turczaninow*		...		W								
pygmaeum, *Bentham*		...	S	W	M	A	N	Y	L			
corymbiflorum, *Schlechtendal* ...		C	S	W	M	A	N	Y				
stipitatum, *F. v. Mueller* ...	F											
incanum, *DeCandolle*	F	C	S		M		N					
Cotula, *DeCandolle*		...		W	M							
Haigii, *F. v. Mueller*		...		W								
laeve, *Bentham*		...	S									
dimorpholepis, *Bentham* ...		...		...		... A	N	Y		K	T	
exiguum, *F. v. Mueller* ...		C		W	M	A	N	Y		K	T	G
moschatum, *Bentham*	F	C	S	W	M	A	N				T	
pterochaetum, *Bentham* ...	F	C	S	W								
Tietkensii, *F. v. Mueller* ...	F			W			N					
Charsleyae, *F. v. Mueller* ...	F											

Waitzia, Wendland (1808).

corymbosa, *Wendland*		...		W	M	A	N				

Helichrysum, Vaillant (1719).

Cassinianum, *Gaudichaud* ...	F	C		W							
Ayersii, *F. v. Mueller*	F										
Lawrencella, *F. v Mueller* ...	F	C		W							
semifertile, *F. v. Mueller* ...	F	C	S	W							
scorpioides, *Labillardiere* ...		...		...		... A					T	G
rutidolepis, *DeCandolle* ...	F					A						
lucidum, *Henckel*	F			W	M	A	N	Y	L	K		G
podolepideum, *F. v. Mueller*		C	S									

obtusifolium, *Son. & F. v. M.*	...	...	...	...	A		Y	L	K		G
Blandowskianum, *Steetz*	...	...	...	...	A						G
adenophorum, *F. v. Mueller*	...	...	...	...		...		...	K	T	
leucopsidium, *DeCandolle*	...	...	...	...	A	N	Y	L	K		G
Baxteri, *F. v. Mueller* ...	...	...	...	...	A		Y	L		T	G
ambiguum, *Turczaninow*	...	F	S		A						
Tepperi, *F. v. Mueller* ...	...	...	...	...	A		Y				
apiculatum, *DeCandolle*	...	F	C	S	W	M	A	N	Y	L	K	T	G
semipapposum, *DeCandolle*	...	...			W	M	A	N	Y			T	G
Dockerii, *F. v. Mueller*...	...	...	...			M							
Thomsoni, *F. v. Mueller*	...	F											
decurrens, *F. v. Mueller*	...	...	...			M	A	N		L			
retusum, *Sonder & F. v. Mueller*	...	S				M	A	N	Y	L	K		
ferrugineum, *Lessing* ...	...	...	...	...	...	...	...	...	...	...	G
cinereum, *F. v. Mueller*	...	...	...	...	...	...	...	...	...	...	G
Kempei, *F. v. Mueller* ...	...	F											

Polycalymma, F. v. Mueller.

Stuartii, *F. v. Mueller* ...	...	F	C	S	W	M						T	

Hyalolepis, DeCandolle.

rhizocephala, *DeCandolle*	...	...	...		M		N	Y	L	K	T	G
Rudallii, *F. v. Mueller*...	...	F	C										

Angianthus, Wendland (1809).

pleuropappus, *Bentham*	...	...	...	...	...		L				
brachypappus, *F. v. Mueller*	...	...	S								
tomentosus, *Wendland* ...	...	F	S		M	A	N	Y	L		T	
pusillus, *Bentham*	...	F	C	S	W	M						
tenellus, *Bentham*	...	...	...	...	...	...	L				

Skirrophorus, DeCandolle.

strictus, *A. Gray*	...	...	...	S		M	A	N	Y	L	K	T	
Preissianus, *Steetz*	...	...	...	...	...	A			L	K	T	G

Gnephosis, Cassini (1820).

Burkittii, *Bentham*	...	...			W								
eriocarpa, *Bentham*	...	...	C										
arachnoidea, *Turczaninow*	...	C	S										
cyathopappa, *Bentham*...	...	...	...	M									
codonopappa, *F. v. Mueller*	...	C											
skirrophora, *Bentham* ...	...	C	S	M									

Calocephalus, R. Brown (1817).

Drummondii, *Bentham*...	...	...	W		A		Y	L		T	
Brownii, *F. v. Mueller*...	...	...	...	...	A		Y	L	K		G
Sonderi, *F. v. Mueller* ...	...	...	...	M							
lacteus, *Lessing* ...	...	...	...	...	A						
citreus, *Lessing* ...	...	...	...	...	A	N	Y			T	G
platycephalus, *Bentham*	...	F	C	S							
Dittrichii, *F. v. Mueller*	...	C									

Eriochlamys, Sonder & F. v. Mueller (1852).

Behrii, *Sonder & F. v. Mueller*	...	...	M		N		L	K	T	
Knappii, *F. v. Mueller*...	...	F									

Cephalipterum, A. Gray (1852).

Drummondii, *A. Gray*... ... ... W

Gnaphalodes, A. Gray (1852).

uliginosum, *A. Gray* ... ... S W M A N Y T

Pterocaulon, Elliot (1824).

sphacelatus, *Benth. & Hook.* ... F C S
Billardieri, *F. v. Mueller* ... F

Craspedia, G. Forster (1786).

Richea, *Cassini* ... ...A N Y L T G
chrysantha, *Bentham* ... ... C M A
globosa, *Bentham* ... ... S N
pleiocephala, *F. v. Mueller* ... C S W M

Chthonocephalus, Steetz (1845).

pseudevax, *Steetz* ... ... C W

Microseris, D. Don (1832).

Forsteri, *J. Hooker* ... ...A N Y L K T G

CANDOLLEACEAE.

Candollea, Labillardiere (1805).

graminifolia, *Swartz* ... ...A K G
Tepperiana, *F. v. Mueller* ... ... K
calcarata, *R. Brown* ... ...A Y K G
perpusilla, *Hooker* ... ... G
floribunda, *R. Brown* ... ... F
despecta, *R. Brown* ... ... S A N L K T G

Leewenhoekia, R. Brown (1810).

dubia, *Sonder* ... ...A Y L K T G

CAMPANULACEAE.

Lobelia, Linne (1737).

rhombifolia, *DeVriese* ... ...A K
microsperma, *F. v. Mueller* ... ...A Y L K
Browniana, *Roem. & Schultes* ... ... G
simplicicaulis, *R. Brown* ... ... G
heterophylla, *Labillardiere* ... F
purpurascens, *R. Brown* ... ... G
pedunculata, *R. Brown* ... ...A G
concolor, *R. Brown* ... ... M
platycalyx, *F. v. Mueller* ... ... K G
anceps, *Thunberg* ... ...A N L K T G
pratioides, *Bentham* ... ... T G
Benthami, *F. v. Mueller* ... C

Isotoma, R. Brown (1810).

petraea, *F. v. Mueller* ... ... F C S W N
scapigera, *G. Don* L
fluviatilis, *F. v. Mueller* ... ... T G

Wahlenbergia, Schrader (1814).

gracilis, *DeCandolle*	F	C	S	W	M	A	N	Y	L	K	T	G

GOODENIACEAE.

Brunonia, Smith (1809).

australis, *Smith*	F					A					T	G

Leschenaultia, R. Brown (1810).

divaricata, *F. v. Mueller* ...	F	C												
striata, *F. v. Mueller*	F													

Dampiera, R. Brown (1810).

stricta, *R. Brown*														G
candicans, *F. v. Mueller* ...	F													
rosmarinifolia, *Schlechtendal*				W	M	A	N	Y	L		T			
marifolia, *Bentham*					M									
lanceolata, *Cunningham*					M					K				

Velleya, Smith (1798).

paradoxa, *R. Brown*					M	A	N	Y	L					G
connata, *F. v. Mueller*	F			W	M									

Selliera, Cavanilles (1799).

radicans, *Cavanilles*						A			L	K				

Catosperma, Bentham (1868).

Muelleri, *Bentham*	F													

Scaevola, Linne (1771).

spinescens, *R. Brown*	F	C	S	W	M			Y						
Groeneri, *F. v. Mueller*				W										
crassifolia, *Labillardiere*				W		A		Y	L	K				G
parvifolia, *F. v. Mueller* ...	F													
depauperata, *R. Brown* ...	F	C												
collaris, *F. v. Mueller*		C		W										
suaveolens, *R. Brown*				...		...		...			T	G		
microcarpa, *Cavanilles*				...		...	A	N						G
aemula, *R. Brown*	F		S	W					L	K				G
humilis, *R. Brown*			S	W			N			K				
ovalifolia, *R. Brown*	F	C		W										
linearis, *R. Brown*						...	A		Y	L	K			

Goodenia, Smith (1794).

Ramelii, *F. v. Mueller*	F													
humilis, *R. Brown*														G
amplexans, *F. v. Mueller*					...	A	N			K				
ovata, *Smith*					...	A		Y	L	K				G
varia, *R. Brown*...			S	W	M	A	N	Y	L	K				
Vilmoriniae, *F. v. Mueller* ...	F													
grandiflora, *Sims*	F													
Chambersii, *F. v. Mueller* ...	F													
albiflora, *Schlechtendal*					...	A	N	Y						
calcarata, *F. v. Mueller*			S	W										

Nicholsoni, *F. v. Mueller* ... F
Mitchellii, *Bentham* ... ... F C
heterochila, *F. v. Mueller* ... F
sepalosa, *F. v. Mueller* ... ... F
Mueckeana, *F. v. Mueller* ... F
Strangfordii, *F. v. Mueller* ... F
geniculata, *R. Brown* ... ... W M A N Y L K T G
hirsuta, *F. v. Mueller* ... ... F
cycloptera, *R. Brown* ... ... F C S W Y
glauca, *F. v. Mueller* ... ... C S M A N Y
microptera, *F. v. Mueller* ... C
elongata, *Labillardiere*... ... ... G
heteromera, *F. v. Mueller* ... C M
pinnatifida, *Schlecht.* ... ... S W M A N Y L T G
pusilliflora, *F. v. Mueller* ... ... S W

Calogyne, R. Brown (1810).

Berardiana, *F. v. Mueller* ... F

PRIMULACEAE.

Centunculus, Linne (1753).

minimus, *Linne* ... ... G

Samolus, Linne (1753).

repens, *Persoon* ... . F M A N Y L K T G

CONVOLVULACEAE.

Ipomoea, Linne (1737).

Davenporti, *F. v. Mueller* ... F
costata, *F. v. Mueller* ... ... F
Muelleri, *Bentham* ... ... F
heterophylla, *R. Brown* ... F C

Convolvulus, Linne (1753).

erubescens, *Sims* ... ... F C S W M A N Y L K T G
sepium, *Linne* ... ... A T G

Polymeria, R. Brown (1810).

longifolia, *Lindley* ... ... F C
angusta, *F. v. Mueller* ... ... F C

Breweria, R. Brown (1810).

rosea, *F. v. Mueller* ... ... F
media, *R. Brown* C

Evolvulus, Linne (1763).

linifolius, *Linne* ... ... F C

Cressa, Linne (1747).

Cretica, *Linne* ... ... M

Dichondra, Forster (1776).

repens, *Forster* ... ... S A N L K T G

Wilsonia, R. Brown (1810).

humilis, *R. Brown* ... ...A Y L K
rotundifolia, *Hooker* ... ...A Y L K T
Backhousii, *Hooker* ... ... K T G

CUSCUTA, Linne.

australis, *R. Brown* ... ... F
Tasmanica, *Engelmann*... ... ... T

BORAGINEAE.

Coldenia, Linne (1747).

procumbens, *Linne* C

Heliotropium, Linne.

curassavicum, *Linne* ... ... F C S M A T
pleiopterum, *F. v Mueller* ... F
Europaeum, *Linne* ... ... S N
undulatum, *Vahl* ... ... F C W
asperrimum, *R. Brown*... ... F C S A N
ovalifolium, *Forskael* C
filaginoides, *Bentham* ... ... F C
tenuifolium, *R. Brown* ... ... F

Halgania, Gaudichaud (1826).

cyanea, *Lindley* ... ... F C S W M A Y L
lavandulacea, *Endlicher* ... ... W A Y K T

Pollichia, Medikus (1783).

Zeylanica, *F. v. Mueller* ... F C S

Rochelia, Reichenbach (1824).

Maccoya, *F. v. Mueller* ... ... M

Echinospermum, Swartz.

concavum, *F. v. Mueller* ... C S W M A N Y

Eritrichium, Schrader (1820).

Australasicum, *DeCandolle* ... ... S M N Y G

Myosotis, Linne.

australis, *R. Brown* ... ... M A Y K G

Cynoglossum, Linne.

suaveolens, *R. Brown* ... ... M A N Y T G
australe, *R. Brown* ... ...A L T G
Drummondii, *Bentham*... ... F C S N

ASCLEPIADEAE.

Sarcostemma, R. Brown (1809).

australe, *R. Brown* ... ... F C S W M N

Cynanchum, Linne (1737).

floribundum, *R. Brown* ... F C S

Daemia, R. Brown (1809.)

Kempeana, *F. v. Mueller* ... F C

Marsdenia, R. Brown (1809).

Leichhardtiana, *F. v. Mueller* F C S M

APOCYNEAE.

Carissa, Linne (1767).

Brownii, *F. v. Mueller*... ... F

Alyxia, Banks (1810).

buxifolia, *R. Brown* ... ... A N Y L K T G

Notonerium, Bentham (1876).

Gossei, *Bentham* ... ... F

GENTIANEAE..

Sebaea, Solander (1810).

ovata, *R. Brown* ... ... M A N Y L K T G
albidiflora, *F. v. Mueller* ... ... G

Erythraea, Persoon (1805).

spicata, *Persoon*... ... ... F C A N Y L K T G

Gentiana, Linne.

saxosa, *Forster* ... ... T G

Limnanthemum, Gmelin.

crenatum, *F. v. Mueller* ... ... M
reniformis, *R. Brown* ... ... S M A N L K T G

JASMINEAE.

Jasminum, Linne.

lineare, *R. Brown* ... ... F S M N
calcareum, *F. v. Mueller* ... F

PLANTAGINEAE.

Plantago, Linne.

varia, *R. Brown* ... ... C S W M A N Y L K T G

LOGANIACEAE.

Mitrasacme, Labillardiere (1804).

pilosa, *Labillardiere* ... ... G
paradoxa, *R. Brown* ... ... M A N Y L K G
distylis, *F. v. Mueller* .. .. A K

Logania, R. Brown (1810).

longifolia, *R. Brown*	...	...	...	...	...	A	N						
crassifolia, *R. Brown*	...	...	...	...	...		...		L	K	T	G
ovata, *R. Brown*...	...	...	...	...	...	A		Y	L	K		G
stenophylla, *F. v. Mueller*	...	...		W								
linifolia, *Schlecht.*	...	...	...	...	...	A		Y			T	
nuda, *F. v. Mueller*	...	...	...	W	M							

SOLANACEAE.

Solanum, Linne.

nigrum, *Linne* ...	...	...	C	S			A	N			K		G
aviculare, *Forster*	...	...		...		...		...		...		...	G
simile, *F. v. Mueller*	...	...		...	S	W	M	A	N	Y	L	K	
fasciculatum, *F. v. Mueller*	...		...			W				Y	L		
ferocissimum, *Lindley* ...	...	F		S									
orbiculatum, *Dunal* ...	...		C		W								
oligacanthum, *F. v. Mueller*	...	F	?										
esuriale, *Lindley* ...	...	F	C		W	M		N					
chenopodium, *F. v. Mueller*	...		C										
Sturtianum, *F. v. Mueller*	...	F	C	S	W								
hystrix, *R. Brown* ...	...		...		W								
eremophilum, *F. v. Mueller*	...		C	S				N					
lacunarium, *F. v. Mueller*	...		C	S	W								
petrophilum, *F. v Mueller*	...	F	C	S	W								
ellipticum, *R. Brown* ...	...	F	C	S	W								

Lycium, Linne (1737).

australe, *F. v. Mueller* ...	...	...	S	W	M	A		Y					

Anthotroche, Endlicher (1839).

Blackii, *F. v. Mueller* ...	...	F	

Datura, Linne (1737).

Leichhardtii, *F. v. Mueller*	...	F	S	

Nicotiana, Linne.

suaveolens, *Lehmann* ...	...	F	C	S	W	M	A	N	Y	L	K		G

Duboisia, R. Brown (1810).

Hopwoodi, *F. v. Mueller*	...	F		W

Anthocercis, Labillardiere (1806).

anisantha, *Endlicher* ...	...	...		W					L				
angustifolia, *F. v. Mueller*	...	...	S			A							
myosotidea, *F. v. Mueller*	...	...	...	...	...	...	...	...	K	T			
Eadesii, *F. v. Mueller* ...	...	...	...	...	...	...	...	...		T			

EPACRIDEAE.

Brachyloma, Sonder (1845).

ericoides, *Sonder* ...	...	...	...	M	A					K			
daphnoides, *Bentham* ...	...	...	...	...	...	...	...				T		
ciliatum, *Bentham* ...	...	...	...	...	A						T	G	

Styphelia, Solander (1786).

adscendens, *R. Brown* ...	...	...	...	...	...	...	...		...	G
pusilliflora, *F. v. Mueller*	...	...	...	...	...	...	...		...	G
Sonderi, *F. v. Mueller* ...	...	...	W	A		L	K	T	G
humifusa, *Persoon* ...	...	...	...	... A	N	Y	L	K	T	G
strigosa, *Smith*	...	...	...	... A			L	K		
australis, *F. v. Mueller*	...	...	...	... A						G
Richei, *Labillardiere* ...	...	...	...	... A	N	Y	L	K	T	G
costata, *F. v. Mueller* ...	...	...	...	...	...		...	K		
striata, *Sprengel*... ...	...	...	W							
collina, *Labillardiere* ...	...	...	...	...	...		...		T	
hirsuta, *F. v. Mueller* ...	...	...	...	...	...		...	K		
concurva, *F. v. Mueller*	...	...	...	... A				K		
virgata, *Labillardiere* ...	...	...	...	... A					T	G
ericoides, *Smith*	...	...	...	...	...		...		...	G
cordifolia, *F. v. Mueller*	...	...	W	M A		Y	L			
hirtella, *F. v. Mueller* ...	...	...	...	... A				K		
rufa, *F. v. Mueller* ...	...	...	...	... A			L	K		
Woodsii, *F. v. Mueller*...	...	...	...	...	...		...	K		G
serrulata, *Labillardiere*	...	...	...	... A				K		
patula, *Sprengel* ...	...	...	...	... A		Y	L	K		
ovalifolia, *Sprengel* ...	...	...	...	... A	N	Y	L	K	T	G
depressa, *Sprengel* ...	...	...	...	... A				K	T	
fasciculiflora, *F. v. Mueller*	...	...	...	... A				K		
elliptica, *Smith*	...	...	...	...	...		...		...	G

Epacris, Cavanilles (1797).

impressa, *Labillardiere*	...	...	...	... A				K	T	G
obtusifolia, *Smith* ...	...	...	...	...	...		...		...	G
lanuginosa, *Labillardiere*	...	...	...	...	...		...		...	G
microphylla, *R. Brown*	...	...	...	...	...		...		...	G

Sprengelia, Smith (1794).

incarnata, *Smith* ...	...	...	...	... A				K		G

LABIATAE.

Mentha, Linne.

australis, *R. Brown* ..	..	F	C		M	A				T	G
gracilis, *R. Brown* ...	...	...	...	... A						T	G
satureioides, *R. Brown*...	...	...	S		A	N	Y	L		T	G

Teucrium, Linne.

sessiliflorum, *Bentham* ...	...	...	W	M		N	Y	L		
integrifolium, *F. v. Mueller*	...	F								
corymbosum, *R. Brown*	...	...	S	W		N				G
racemosum, *R. Brown* ...	...	F	C	S	W	M	A	N	Y	L	

Ajuga, Linne (1737).

australis, *R. Brown* ...	...	...	S		M	A	N		K		G

Microcorys, R. Brown (1810).

Macrediana, *F. v. Mueller*	...	F

Westringia, Smith (1797).

rigida, *R. Brown* ... ... W M A N Y L K T
Dampieri, *R. Brown* ... ... W L

Lycopus, Linne.

australis, *R. Brown* ... ... M A T G

Plectranthus, L'Heritier (1785).

parviflorus, *Willdenow* ... ... F

Prunella, Linne.

vulgaris, *Linne* ... ... A G

Scutellaria, Linne.

humilis, *R. Brown* ... ... K

Prostanthera, Labillardiere (1806).

lasiantha, *Labillardiere* ... ... G
rotundifolia, *R. Brown* ... ... T
striatiflora, *F. v. Mueller* ... F C S W
Wilkieana, *F. v. Mueller* ... F
eurybioides, *F. v. Mueller* ... ... A
spinosa, *F. v. Mueller* ... ... S L K T
Behriana, *Schlechtendal* ... ... A T
Baxteri, *Cunningham* ... ... W
ringens, *Bentham* ... ... F
coccinea, *F. v. Mueller* ... ... M A Y L K T
chlorantha, *F. v. Mueller* ... ... A Y L K
calycina, *F. v. Mueller* L

LENTIBULARINEAE.

Utricularia, Linne (1737).

flexuosa, *Vahl* ... ... G
dichotoma, *Labillardiere* ... ... A K T G
lateriflora, *R. Brown* ... ... G

Polypompholyx, Lehmann (1844).

tenella, *Lehmann* ... ... A K G

OROBANCHEAE.

Orobanche, Linne.

australiana, *F. v. Mueller* ... C S W A Y L

SCROPHULARINEAE.

Mimulus, Linne (1741).

gracilis, *R. Brown* ... ... G
repens, *R. Brown* ... ... M A N L K
prostratus, *Bentham* ... ... F C

Mazus, Loureiro (1790).

pumilio, *R. Brown* ... ... G

Buechnera, Linne (1737).

linearis, *R. Brown* .. ... F

Limosella, Linne.

aquatica, *Linne* ... ... S M A N L K G
Curdieana, *F. v. Mueller* ... ... S W M

Peplidium, Delile (1813).

humifusum, *Delile* ... ... F
Muelleri, *Bentham* C

Glossostigma, Arnott (1836).

Drummondii, *Bentham*... ... ... M
elatinoides, *Bentham* ... ... M

Euphrasia, Linne.

Brownii, *F. v. Mueller* ... ... W A N Y L K T G
scabra, *R. Brown* ... ... A L G

Stemodia, Linne (1759).

Morgania, *F. v. Mueller* ... F C S M A
viscosa, *Roxburgh* ... ... F
pedicellaris, *F. v. Mueller* ... F

Gratiola, Linne.

pedunculata, *R. Brown*... ... ... M
Peruviana, *Linne* ... ... M A K G

Veronica, Linne.

decorosa, *F. v. Mueller*... ... ... S N
Derwentia, *Andrews* ... ... A K G
gracilis, *R. Brown* ... ... A N G
distans, *R. Brown* ... ... A L K T
calycina, *R. Brown* ... ... Y K G
peregrina, *Linne* ... ... A N G

BIGNONIACEAE.

Tecoma, Jussieu (1789).

australis, *R. Brown* ... ... F

ACANTHACEAE.

Justicia, Linne (1737).

procumbens, *Linne* ... ... F C S
Bonneyana, *F. v. Mueller* ... ... M
Kempeana, *F. v. Mueller* ... F

Ruellia, Linne.

australis, *R. Brown* ... ... C M
primulacea, *F. v. Mueller* ... F C

PEDALINEAE.

Josephinia, Ventenat (1804).

Eugeniae, *F. v. Mueller* ... C

VERBENACEAE.

Verbena, Linne.

officinalis, *Linne* ... ... M A T G
macrostachya, *F. v. Mueller* ... F C

Newcastlia, F. v. Mueller (1857).

cladotricha, *F. v. Mueller* ... F
spodiotricha, *F. v. Mueller* ... F C
cephalantha, *F. v. Mueller* ... F
bracteosa, *F. v. Mueller* ... F
Dixoni, *F. v. Mueller & Tate* ... ... M N

Dicrastylis, Drummond & Harvey (1855).

ochrotricha, *F. v. Mueller* ... F
Gilesii, *F. v. Mueller* ... ... F
Doranii, *F. v. Mueller* ... ... F
Beveridgei, *F. v. Mueller* ... F W
Lewellini, *F. v. Mueller* ... F

Clerodendrum, Burmann (1737).

floribundum, *R. Brown*... ... F

Spartothamnus, Cunningham (1830).

teucriiflorus, *F. v. Mueller* ... F
puberulus, *F. v. Mueller* ... F

Avicennia, Linne (1737).

officinalis, *Linne* ... ... A N Y L

MYOPORINEAE.

Myoporum, Banks & Solander (1786).

montanum, *R. Brown* ... ... F C S M
insulare, *R. Brown* ... ... A N Y L K T G
viscosum, *R. Brown* ... ... A N Y K G
deserti, *Cunningham* ... ... S W M N Y
humile, *R. Brown* ... ... W M A Y L K G
brevipes, *Bentham* C
platycarpum, *R. Brown* ... ... S W M A N Y T

Eremophila, R. Brown (1810).

Dalyana, *F. v. Mueller*... ... C
scoparia, *F. v. Mueller*... ... C S W M N T
Delisserii, *F. v. Mueller* ... ... W
crassifolia, *F. v. Mueller* L
Behriana, *F. v. Mueller* ... ... A Y L K
Weldii, *F. v. Mueller* ... ... W
Christophori, *F. v. Mueller* ... F
densifolia, *F. v. Mueller* ...

gibbosifolia, *F. v. Mueller*	...		...		...		...	A			L		T	
divaricata, *F. v. Mueller*	...		...		...		M						T	
polyclada, *F. v. Mueller*	...		C				M							
Goodwinii, *F. v. Mueller*	...	F	C											
Elderi, *F. v. Mueller* ...	...	F		S										
Willsii, *F. v. Mueller* ...	...	F												
santalina, *F. v. Mueller*	...		...	S										
longifolia, *F. v. Mueller*	...	F	C	S	W		M		N	Y				
Freelingii, *F. v. Mueller*	...	F	C	S										
bignoniiflora, *F. v. Mueller*	...	F	C				M						T	
MacDonneli, *F. v. Mueller*	...	F	C	S	W									
Bowmani, *F. v. Mueller*	...		C											
rotundifolia, *F. v. Mueller*	...	F	C											
leucophylla, *Bentham* ...	...	F												
Paisleyi, *F. v. Mueller* ...	...		...		W									
Sturtii, *R. Brown* ...	...	F	C											
exilifolia, *F. v. Mueller*	...	F												
Mitchelli, *Bentham* ...	...	F												
Gibsoni, *F. v. Mueller* ...	...	F												
Berryi, *F. v. Mueller* ..	...		...		W									
Clarkei, *F. v. Mueller* ...	...	F												
Gilesii, *F. v. Mueller* ...	...	F	C											
Hughesii, *F v. Mueller*	...	F												
oppositifolia, *R. Brown*	...		...	S	W				N					
Latrobei, *F. v. Mueller*...	...	F	C	S	W									
Brownii, *F. v. Mueller* ...	...	F	C	S	W		M			Y		K	T	
Duttonii, *F. v. Mueller*...	...		C	S										
Maculata, *F. v. Mueller*	...	F	C	S	W		M							
denticulata, *F. v. Mueller*	...		...		W									
latifolia, *F. v. Mueller* ...	...		C	S	W		M							
alternifolia, *R. Brown* ...	...	F		S	W		M		N					

CONIFERAE.

Callitris, Ventenat (1808).

verrucosa, *R. Brown* ...	...	F		S		M	A	N	Y	L	K	T	
cupressiformis, *Ventenat*	...		...		...	...	A				K		

CYCADEAE.

Encephalartos, Lehmann, (1834).

MacDonnelli, *F. v. Mueller* ... F

HYDROCHARIDEAE.

Ottelia, Persoon (1805).

ovalifolia, *Richard*	...	...	...	...	M	A				K		G

Vallisneria, Linne (1753).

spiralis, *Linne* ...	...	...	...	..	M							G

Blyxa, Noronha (1806).

Roxburghii, *Richard* C

Hydrilla, Richard (1811).

verticillata, *Caspary* ... ... M

Halophila, DuPetit-Thouars (1806).

ovalis, *Hooker* ... ... A Y L K G

ORCHIDEAE.

Dipodium, R. Brown (1810).

punctatum, *R. Brown* ... ... A G

Cymbidium, Swartz (1799).

canaliculatum, *R. Brown* ... C

Thelymitra, Forster (1776)

ixioides, *Swartz* ... ... A G
longifolia, *Forster* ... ... A N Y K G
parviflora, *R. Brown* ... ... A
aristata, *Lindley* ... ... A L G
grandiflora, *Fitzgerald* ... ... A
fuscolutea, *R. Brown* ... ... A L
luteocilium, *Fitzgerald* ... ... A
urnalis, *Fitzgerald* ... ... A
flexuosa, *Endlicher* ... ... A K
antennifera, *Hooker* ... ... A Y K T G
carnea, *R. Brown* ... ... A Y
rubra, *Fitzgerald* ... ... A G

Calochilus, R. Brown (1810).

Robertsoni, *Bentham* ... ... A G

Diuris, Smith (1798).

punctata, *Smith* ... ... G
palustris, *Lindley* ... ... A Y L T G
maculata, *Smith* ... ...
pedunculata, *R. Brown* ... ... A Y G
sulphurea, *R. Brown* ... ... A K G
longifolia, *R. Brown* ... ... A L K G

Orthoceras, R. Brown (1810).

strictum, *R. Brown* ... ... A

Cryptostylis, R. Brown (1810).

longifolia, *R. Brown* ... ... G

Prasophyllum, R. Brown (1810).

elatum, *R. Brown* ... ... A Y K G
australe, *R. Brown* ... ... G
fuscum, *R. Brown* ... ... A Y L
patens, *R. Brown* ... ... A Y G
despectans, *Hooker* ... ... A
nigricans, *R. Brown* L

Spiranthes, L. C. Richard (1818).

australis, *Lindley* ... ... G

Microtis, R. Brown (1810).

porrifolia, *R. Brown*	...	...	...	...	...	A	N	Y	L	K	T	G
minutiflora, *F. v. Mueller*	...	...	...	...	...	A						G

Corysanthes, R. Brown (1810).

pruinosa, *Cunningham*	...	...	...	...	...	A				K		G

Pterostylis, R. Brown (1810).

concinna, *R. Brown*	...	...	...	...	...	A						
nana, *R. Brown* ...	...	...	...	W						K		G
nutans, *R. Brown*	...	...	...	...	...		...		...	K		G
pedunculata, *R. Brown*		...	...	...	...	A						
curta, *R. Brown*...	...	...	...	...	...	A						
cucullata, *R. Brown*	...	...	...	...	...	A						G
praecox, *R. Brown*	...	...	...	...	...		...		...	K		
reflexa, *R. Brown*	...	...	...	...	...	A		Y				
obtusa, *B. Brown*	...	...										
barbata, *Lindley*	...	...	...	...	...	A		Y	L	K		
mutica, *R. Brown*	...	...	...	W				Y	L			G
rufa, *R. Brown* ...	...	...	...	S	W	A		Y				
longifolia, *R. Brown*	...	...	...	...	...	A			L			G
vittata, *Lindley*...	...	...	...	...	...	A		Y		K		

Acianthus, R. Brown (1810).

caudatus, *R. Brown*	...	...	...	...	...		...		...	K		
exsertus, *R. Brown*	...	...	...	...	...	A		Y				

Cyrtostylis, R. Brown (1810).

reniformis, *R. Brown*	...	...	...	...	...	A		Y	L	K		G

Glossodia, R. Brown (1810).

major, *R. Brown*	...	...	..	...	...	A		Y				G

Lyperanthus, R. Brown (1810).

nigricans, *R. Brown*	...	...	...	...	...	A		Y		K		

Eriochilus, R. Brown (1810).

autumnalis *R. Brown*	...	...	...	...	...	A		Y		K		G
fimbriatus, *F. v. Mueller*		...	...	...	...	A						

Caladenia, R. Brown (1810).

Cairnsiana, *F. v. Mueller*		...	...	...	...	A						
reticulata, *Fitzgerald*	...	...	...	...	...	A						
toxochila, *Tate*	...	...	...	W								
tentaculata, *Tate*	...	...	...	W								
Menziesii, *R. Brown*	...	...	...	...	...	A						G
filamentosa, *R. Brown*	...	...	...	...	...		...		...	K		G
dilatata, *R. Brown*	...	...	...	...	...	A		Y	L	K	T	G
Patersoni, *R. Brown*	...	...	...	...	...	A	N	Y	L			G
leptochila, *Fitzgerald*	...	...	...	...	...	A	N					
latifolia, *R. Brown*	...	...	...	...	...	A		Y	L	K		G
coerulea, *R. Brown*	...	...	...	...	...	A						
carnea, *R. Brown*	...	...	...	...	...	A		Y		K		G
deformis, *R. Brown*	...	...	...	...	...	A		Y	L	K	T	G

IRIDEAE.

Patersonia, R. Brown (1807).

glauca, *R. Brown*	...	...	...	...	...	A					K			G
longiscapa, *Sweet*	...	...	...	...	...	A						T		G

Sisyrinchium, Linne (1737).

cyaneum, *Lindley*	...	...	...	...	...	A					K			G

AMARYLLIDEAE.

Hypoxis, Linne (1759).

hygrometrica, *Labillardiere*	...	...	...	...	...			...		...				G
glabella, *R. Brown*	...	...	...	...	...	A			L			T		G
pusilla, *Hooker*	...	...	...	...	W	M	A	N	Y	L				

Crinum, Linne (1737).

angustifolium *R. Brown*	...	F												
flaccidum, *Herbert*	...	...	C	S										
pedunculatum, *R. Brown*	...	...	...	M										

Calostemma, R. Brown (1810).

purpureum, *R. Brown*	...	...	...	...	...	A	N	Y						
luteum, *Sims*	...	...	...	C		M								

LILACEAE.

Burchardia, R. Brown (1810).

unbellata, *R. Brown*	...	...	...	...	...	A			Y	L	K			G

Wurmbea, Thunberg (1781).

dioica, *F. v. Mueller*	...	...	F	C	S		M	A	N	Y	L	K		G

Xerotes, R. Brown (1810).

longifolia, *R. Brown*	...	...	...	...	...	A							T	G
dura, *F. v. Mueller*	...	...	...	S			A	N	Y					
Brownii, *F. v. Mueller*	...	...	...	...	...	A								G
effusa, *Lindley*	...	...	...	...	W	M	A		Y					G
micrantha, *Endlich.*	...	...	...	...	...	A				L				
Thunbergii, *F. v. Mueller*	...	...	...	...	...	A								
glauca, *R. Brown*	...	...	...	...	W		A		Y	L			T	G
elongata, *Bentham*	...	...	...	...	...		...	...		...			...	G
leucocephala, *R. Brown*	...	F			W	M	A		Y					
juncea, *F. v. Mueller*	...	...	...	...	...	A				L			T	

Dianella, Lamarck (1780).

revoluta, *R. Brown*	...	...	...	...	W	M	A	N	Y					G
laevis, *R. Brown*	...	...	...	...	...	A						K		G

Bulbine, Linne (1737).

bulbosa, *Haworth*	...	...	...	...	...	A	N	Y	L					G
semibarbata, *Haworth*	...	...	C	S	W	M	A	N	Y	L	K	T		G

Caesia, R. Brown (1810).

vittata, *R. Brown*	...	...	...	...	...	A			Y					G
parviflora, *R. Brown*	...	...	...	...	...	A								

Arthropodium, R. Brown (1810).

paniculatum, *R. Brown* ... ... G
minus, *R. Brown* ... ... Y L
strictum, *R. Brown* ... ... S A N Y K T G
fimbriatum, *R. Brown* ... ... A L K

Thysanotus, R. Brown (1810).

dichotomus, *R. Brown* ... ... F A L K G
tuberosus, *R. Brown* ... ... F S A K T G
exasperatus, *F. v. Mueller* ... ... S Y
Baueri, *R. Brown* ... ... W M A Y G
Patersoni, *R. Brown* ... ... A N Y L K T G
exiliflorus, *F. v. Mueller* ... F C

Tricoryne, R. Brown (1810).

elatior, *R. Brown* ... ... C A L G

Chamaescilla, F. v. Mueller (1870).

corymbosa, *F. v. Mueller* ... ... A Y L K G

Laxmannia, R. Brown (1810).

sessiliflora, *Decaisne* ... ... A K T G

Calectasia, R. Brown (1810).

cyanea, *R. Brown* ... ... T G

Corynotheca, F. v. Mueller (1870).

lateriflora, *F. v. Mueller* ... F M

Xanthorrhoea, Smith (1798).

quadrangulata, *F. v. Mueller* ... ... A K T G
Tateana, *F. v. Mueller* ... ... A L K
minor, *R. Brown* ... ... G
semiplana, *F. v. Mueller* ... ... S A N L T G

XYRIDEAE.

Xyris, Linne (1737).

operculata, *Labillardiere* ... ... A
gracilis, *R. Brown* ... ... G

COMMELINEAE.

Commelina, Linne.

ensifolia, *R. Brown* ... ... F

ALISMACEAE.

Damasonium, Jussieu.

australe, *Salisbury* ... ... M A

JUNCACEAE.

Luzula, DeCandolle (1805).

campestris, *DeCandolle* ... ... A N L K G

Juncus, Linne.

planifolius, *R. Brown*		C				A					T	G
caespititius, *Meyer*		...	...	...	A	N				K		G
bufonius, *Linne*		...	S	M	A	N	Y	L	K	T	G
homalocaulis, *F. v. Mueller* ...		...	...	...	...	...	...	...	...	...	G
pallidus, *R. Brown*		...	S	M	A	N	Y	L	K	T	G
pauciflorus, *R. Brown*		...	...	...	A				K		G
communis, *Meyer*		...	S	W	M	A	N	Y	L		T	G
prismatocarpus, *R. Brown* ...		...	S		M	A	N					G
maritimus, *Lamarck*		...	...	...	A				L	K		

PALMAE.

Livistona, R. Brown (1810).

Mariae, *F. v. Mueller*		F											

TYPHACEAE.

Typha, Linne.

angustifolia, *Linne*		F		S		M	A	N			L	K	T	G

FLUVIALES.

Triglochin, Linne.

centrocarpa, *Hooker*		C	S	W	M	A			Y		K		G
mucronata, *R. Brown*		...	...		...	A				L	K	T	G
striata, *Ruiz & Pavon*		...	...		M	A	N			L	K	T	G
procera, *R. Brown*		...	...		M	A					K		G

Potamogeton, Linne.

Tepperi, *Bennett*		...	S		M	A	N			L	K	T	G
tenuicaulis, *F. v. Mueller* ...													
crispus, *Linne*		...	...		M								
ochreatus, *Raoul*		...	...		...	A					K		
acutifolius, *Link*		...	...		M								
pectinatus, *Linne*		...	...		...	A				L	K		

Posidonia, Koenig (1806).

australis, *Hooker*		...	...		...	A			Y				

Ruppia, Linne (1735).

maritima, *Linne*		...	...		...	A				L	K	T	G

Zostera, Linne (1747).

nana, *Mertens*		...	...		...	A			Y				G
Tasmanica, *Mertens* ...		...	...		...	A							

Lepilaena, Drummond (1855).

Preissii, *F. v. Mueller*		C				A				L	K	T	G
australis, *Drummond*		...	...		...		...		...			T	

Cymodocea, Koenig (1806).

antarctica, *Endlicher*		...	...		...	A			Y	L			

Naias, Linne (1735).

tenuifolia, *R. Brown* ... ... M
major, *Allioni* ... ... F

LEMNACEAE.

Lemna, Linna (1735).

trisulca, *Linne* ... ... M K G
minor, *Linne* ... ... M K G
oligorrhiza, *Kurz* ... ... T

Wolffia, Horkel (1839).

Michelii, *Schleiden* ... ... M G

RESTIACEAE.

Trithuria, J. Hooker (1860).

submersa, *Hooker* ... ... M K

Aphelia, R. Brown (1810).

gracilis, *Sonder* ... ... A K G
pumilio, *F. v. Mueller* ... ... A K G

Centrolepis, Labillardiere (1804).

polygyna, *Hieron* ... ... M L K G
glabra, *F. v. Mueller* ... ... M
aristata, *Roem. & Schult.* ... ... S M A Y L K T G
fascicularis, *Labillardiere* ... ... A G
strigosa, *Roem. & Schult.* ... ... S A N L K G

Lepyrodia, R. Brown (1810).

Muelleri, *Bentham* ... ... G

Restio, Linne (1767).

complanatus, *R. Brown* ... ... G
tetraphyllus, *Labillardiere* ... ... G

Leptocarpus, R. Brown (1810).

tenax, *R. Brown* ... ... A K G
Brownii, *Hooker* ... ... A L G

Calostrophus, Labillardiere (1806).

lateriflorus, *F. v. Mueller* ... ... A G
fastigiatus, *F. v. Mueller* ... ... A K G

Lepidobolus, Nees (1846).

drapetocoleus, *F. v. Mueller* ... ... A G

CYPERACEAE.

Lepidospora, F. v. Mueller (1875).

tenuissima, *F. v. Mueller* ... ... A G

Kyllingia, Rottboell (1773).

monocephala, *Rottboell*					M							
intermedia, *R. Brown*						A						

Cyperus, Linne.

eragrostis, *Vahl*		C				A						G
tenellus, *Linne*						A						
gracilis, *R. Brown*		C										
pygmaeus, *Rottboell*		C										
squarrosus, *Linne*		C										
difformis, *Linne*		C			M							
trinervis, *R. Brown*					M							
vaginatus, *R. Brown*	F	C	S		M	A	N		L		T	
holoschoenus, *R. Brown*	F											
Gilesii, *Bentham*		C										
fulvus, *R. Brown*		C										
alterniflorus, *R. Brown*			S	W								
Iria, *Linne*		C										
diphyllus, *Retzius*		C										
subulatus, *R. Brown*	F	C										
rotundus, *Linne*	F	C										
lucidus, *R. Brown*					M	A						
exaltatus, *Retzius*			S		M							

Schoenus, Linne (1737).

capillaris, *F. v. Mueller*										K		G
aphyllus, *Boeckeler*					M							
brevifolius, *R. Brown*						A						G
apogon, *Röm. & Schult.*						A	N	Y	L	K		G
axillaris, *Poiret*						A						
sculptus, *Boeckeler*									L	K		
fluitans, *Hooker*										K		
sphaerocephalus, *Poiret*												G
nitens, *Poiret*						A		Y	L	K	T	G
deformis, *Poiret*									L			
Tepperi, *F. v. Mueller*				W		A		Y	L	K		
discifer, *Tate*										K		

Fimbristylis, Vahl (1806).

communis, *Kunth*			S		M							
velata, *R. Brown*		C			M							
ferruginea, *Vahl*	F	C										
barbata, *Bentham*		C										
Neilsoni, *F. v. Mueller*					M							

Heleocharis, R. Brown (1810).

sphacelata, *R. Brown*			S			A	N			K		G
acuta, *R. Brown*			S		M	A	N		L	K	T	G
multicaulis, *Smith*			S			A	N			K		G
acicularis, *R. Brown*					M							

Scirpus, Linne.

pungens, *Vahl*					M	A	N		L			G
maritimus, *Linne*					M	A						
lacustris, *Linne*		C	S		M	A	N					G
litoralis, *Schrader*	F		S			A	N					

Isolepis, R. Brown.

fluitans, *R. Brown*						...	A				K		G
setacea, *R. Brown*						...	A				K		
riparia, *R. Brown*						M	A	N	Y	L	K		G
cartilaginea, *R. Brown*				C	S	M	A	N	Y	L	K		G
inundata, *R. Brown*					S	M	A	N			K		G
supina, *R. Brown*						M							
nodosa, *R. Brown*					S	M	A	N	Y	L	K		G

Lipocarpha, R. Brown (1818).

monocephala, *R. Brown*						M							

Fuirena, Rottboell (1818).

glomerata, *Lamarck*					F								

Carex, Linne.

inversa, *R. Brown*						...	A						G
chlorantha, *R. Brown*						...	A						
tereticaulis, *F. v. Mueller*					S		A	N		L	K	T	
paniculata, *Linne*						...	A				K		G
caespitosa, *R. Brown*					S		A	N					G
pumila, *Thunberg*						...	A	N					G
breviculmis, *R. Brown*						...	A						G
Gunniana, *Boott*					S		A						G
pseudocyperus, *Linne*						...	A				K		G

Caustis, R. Brown (1810).

pentandra, *R. Brown*						...	A				K		G

Cladium, P. Browne (1756).

mariscus, *R. Brown*						...	A						G
articulatum, *R. Brown*					S		A						G
glomeratum, *R. Brown*						...	A						G
tetraquetrum, *Hooker*						...	A				K		
schoenoides, *R. Brown*						...	A			L	K	T	G
filum, *R. Brown*						...	A		Y	L	K		G
Gunnii, *Hooker*						...	A						
junceum, *R. Brown*					S		A	N		L	K		G
trifidum, *F. v. Mueller*						...	A						
radula, *R. Brown*						...	A						G
psittacorum, *F v. Mueller*						...	A						G
lanigerum, *R. Brown*						...	A		Y	L			
deustum, *R. Brown*						...	A		Y	L	K	T	

Lepidosperma, Labillardiere (1804).

longitudinale, *Labillardiere*							...			...		...	G
exaltatum, *R. Brown*							...			...		...	G
gladiatum, *Labillardiere*						...	A		Y	L	K	T	G
elatius, *Labillardiere*						...	A						
concavum, *R. Brown*						...	A						
viscidum, *R. Brown*				S	W		A		Y	L	K		G
laterale, *R. Brown*						M	A						G
congestum, *R. Brown*						...		...		L			
globosum, *Labillardiere*						...		...		...		...	G
lineare, *R. Brown*						...	A				K		

semiteres, *F. v. Mueller*						A					T	
canescens, *Boeck.*						A					T	G
filiforme, *Labillardiere*						A				K	T	G
carphoides, *F. v. Mueller*						A			L	K	T	G

Chorizandra, R. Brown (1810).

enodis, *Nees*						A		Y	L	K		G

GRAMINEAE.

Setaria, Palisot (1812).

glauca, *Palisot*	F											
macrostachya, *H. B. & K.*	F											
viridis, *Palisot*	F	C	S									

Pennisetum, L. Richard (1805).

refractum, *F. v. Mueller*	F	C										

Panicum, Linne.

coenicolum, *F. v. Mueller*		C	S		M							
divaricatissimum, *R. Brown*	F		S		M	A						
prolutum, *F. v. Mueller*					M	A	N					
effusum, *R. Brown*		C	S	W	M	A	N					G
Mitchelli, *Bentham*		C										
decompositum, *R. Brown*	F	C	S	W								
spinescens, *R. Brown*					M							
Crus-galli, *Linne*					M	A						
adspersum, *Trinius*		C										
pauciflorum, *R. Brown*	F											
leucophaeum, *H. B. K.*	F	C	S	W			N					
argenteum, *R. Brown*	F											
gracile, *R. Brown*			S		M	A						
helopus, *Trinius*		C	S		M							
Gilesii, *Bentham*	F	C										
distachyum, *Linne*	F	C										
reversum, *F. v. Mueller*	F	C	S									

Spinifex, Linne (1767).

paradoxus, *Bentham*	F	C	S									
hirsutus, *Labillardiere*						A		Y	L	K	T	G

Neurachne, R. Brown (1810).

alopecuroides, *R. Brown*	F					A	N	Y	L		T	G
Mitchelliana, *Nees*					M							
Munroi, *F. v. Mueller*				W	M							

Hemarthria, R. Brown (1810).

compressa, *R. Brown*					N	A						

Imperata, Cyrillo (1792).

arundinacea, *Cyrillo*	F					A			L			

Erianthus, L. Richard (1803).

fulvus, *Kunth*	F	C			M							

Andropogon, Linne.

sericeus, *R. Brown*	F	C	S				N							
pertusus, *Willdenow*	F													
annulatus, *Forskael*		C												
punctatus, *Roxburgh*		C	S				N							
exaltatus, *R. Brown*	F	C	S			A	N							
bombycinus, *R. Brown*... ...	F				M	A							T	
gryllus, *Linne*	F													

Anthistiria, Linne, fil. (1779).

ciliata, *Linne*	F	C	S			A	N	Y	L			T	G	
avenacea, *F. v. Mueller* ...	F	C			M									
membranacea, *Lindley*		C												

Eriochloa, Humboldt & Kunth (1815).

polystachya, *Humboldt & Kunth*	F	C	S		M									

Perotis, Aiton (1789).

rara, *R. Brown*	F	C	S											

Tragus, Haller (1768).

racemosus, *Haller*	F	C	S	W	M									

Ehrharta, Thunberg (1779).

stipoides, *Labillardiere*...						A					K		G	

Pappophorum, Schreber (1791).

commune, *F. v. Mueller* ...	F	C	S	W	M	A	N							

Lepturus, R. Brown (1810).

incurvatus, *Trinius*					M	A	N	Y	L	K	T			
cylindricus, *Trinius*						A							G	

Echinopogon, Palisot (1812).

ovatus, *Palisot*						A	N			K			G	

Alopecurus, Linne (1735).

geniculatus, *Linne*			S		M	A							G	

Stipa, Linne (1737).

elegantissima, *Labillardiere*			S	W	M	A		Y						
Tuckeri, *F. v. Mueller*...				...	M									
teretifolia, *Steudel*						...	...	Y	L	K				
flavescens, *Labillardiere*						A			L					
Muelleri, *Tate*						A								
setacea, *R. Brown*			S		M		N		L					
semibarbata, *R. Brown*... ...		C				A		Y	L	K	T	G		
pubescens, *R. Brown*			S		M		N							
aristiglumis, *F. v. Mueller*			S		M		N	Y	L	K				
scabra, *Lindley*	F	C	S		M	A		Y					G	

Chloris, Swartz (1788).

pectinata, *Bentham*		C												
acicularis, *Lindley*	F	C	S		M		N							
truncata, *R. Brown*	F		S											
barbata, *Swartz*	F	C												
scariosa, *F. v. Mueller*	F													

Dichelachne, Endlicher (1833).

crinita, *J. Hooker*	...	...	...	S			A	N	Y		K			G
sciurea, *Hooker* ...	...	...	...	...	...	...	A				K			G

Agrostis, Linne (1735).

scabra, *Willdenow*	...	...	...	...	...		...		...		...			G
venusta, *Trinius*	...	...	...	...	...		...		...		...			G
densa, *F. v. Mueller*	...	...	...	...	...	A								
Solandri, *F. v. Mueller*		...	...	...	M	A	N	Y	L	K	T	G		
quadriseta, *R. Brown*	...	...	...	...	...	A	N			K				
montana, *R. Brown*	...	...	...	...	...	A								

Aristida, Linne (1753).

stipoides, *R. Brown*	...	...	F	C	S									
arenaria, *R. Brown*	...	...	F	C	S		M	A						
leptopoda, *Bentham*	...	...		...		...	M							
Behriana, *F. v. Mueller*		...		...		...	M	A	N	Y			T	
ramosa, *R. Brown*	...	...	F		S									
calycina, *R. Brown*	...	...	F		S									

Amphipogon, R. Brown (1810).

strictus, *R. Brown*	...	...	...		W		A		Y					G

Pentapogon, R. Brown (1810).

Billardieri, *R. Brown*	...	...	...	...	...	A								

Sporobolus, R. Brown (1810).

Virginicus, *Humboldt & Kunth*			C	S		M	A		Y	L	K			G
Indicus, *R. Brown*	...	...	F											
Lindleyi, *Bentham*	...	...	F	C	S	W								
actinocladus, *F. v. Mueller*	...	F	C		W									

Cynodon, L. Richard (1805).

Dactylon, *Richard*	...	...	...		...	M	A							G
convergens, *F. v. Mueller*	...		C											
ciliaris, *Bentham*	...	...	C											

Aira, Linne (1737).

caespitosa, *Linne*	...	...	...	...	...		...		...		...			G

Eriachne, R. Brown (1810).

aristidea, *F. v. Mueller*...	...		C											
ovata, *Nees* ...	...	...	C											
pallida, *F. v. Mueller* ...	...	F												
scleranthoides, *F. v. Mueller* ...	F			W										
mucronata, *R. Brown* ...	...	F												
obtusa, *R. Brown*	...	...	...	...	M									

Triraphis, R. Brown (1810).

mollis, *R. Brown*	...	...	F	C	S	W	M							

Danthonia, DeCandolle (1805).

bipartita, *F. v. Mueller*...	...	...	...	...	M									
carphoides, *F. v. Mueller*	...	...	...	...	M			N						
penicillata, *F. v. Mueller*	...	...	S	W		A	N	Y	L	K			G	
nervosa, *Hooker*...	...	...	...	S		M	A	N	Y		K			G

Astrebla, F. v. Mueller (1876).

pectinata, *F. v. Mueller* ... F C S
triticoides, *F. v. Mueller* ... C

Agropyron, Gaertner (1770).

scabrum, *Palisot* ... ... M A N Y K T G

Elytrophorus, Palisot (1812).

articulatus, *Palisot* ... ... C M

Arundo, Linne.

Phragmites, *Linne* ... ... F M A N L T G

Bromus, Linne (1735).

arenarius, *Labillardiere* ... F S W M A N Y L K T G

Festuca, Linne.

duriuscula, *Linne* ... ...A N

Diplachne, Palisot (1812).

loliiformis, *F. v. Mueller* ... F C S
Muelleri, *Bentham* C
fusca, *Palisot* ... ... C M

Schedonorus, Palisot (1812).

litoralis, *Palisot* ... ... S W M A N L K T

Distichlis, Rafinesque (1819).

maritima, *Rafinesque* ... ...A N Y K T G

Eleusine, Gaertner (1788).

cruciata, *Lamarck* ... ... F C S M
digitata, *Sprengel* ... ... F

Triodia, R. Brown (1810).

Mitchelli, *Bentham* ... ... F
pungens, *R. Brown* ... ... F
irritans, *R. Brown* ... ... F C S W M A N Y

Eragrostis, Palisot (1812).

tenella, *Palisot* ... ... F C
trichophylla, *Bentham* ... ... C S W
leptocarpa, *Bentham* ... ... C S
pilosa, *Palisot* ... ... M G
diandra, *Steudel* ... ... M A
Brownii, *Nees* ... ... F S W M A L T G
concinna, *Steudel* ... ... F C
speciosa, *Steudel* C
laniflora, *Bentham* ... ... C S
chaetophylla, *Steudel* ... ... C S M
eriopoda, *Bentham* ... ... M
lacunaria, *F. v. Mueller* ... ... M
falcata, *Gaudichaud* ... ... C M

Poa, Linne (1737).

Billardieri, *Steudel*	...	...	...	...	...	...	...	..		...	G
nodosa, *Nees*	...	...	...	...	M	A	N		L		T	G
caespitosa, *Forster*	...	...	...	S	W	A	N	Y	L	K	T	G
lepida, *F. v. Mueller*	...	...	...		W	M	N	Y	L	K	T	
fluitans, *Scopoli*	...	...	...	...	...	A						
Fordeana *F. v. Mueller*		...	...	...	M							
syrtica, *F. v. Mueller*	...	...	...	...	...	A		Y		K	T	
ramigera, *F. v. Mueller*		...	C	S	M							

LYCOPODIACEAE.

Lycopodium, Linne.

Carolinianum, *Linne*	...	...	...	...	...	A						
laterale, *R. Brown*	...	...	...	...	...	A				K		
densum, *Labillardiere*	...	...	...	...	...	A						

Selaginella, Palisot (1805).

Preissiana, *Spring*	...	...	...	...	...	A				K	T	G
uliginosa, *Spring*	...	...	...	...	...	...	...	...		...		G

RHIZOSPERMAE.

Azolla, Lamarck (1783).

pinnata, *R. Brown*	...	...	..	...	M							
filiculoides, *Lamarck*	...	...	..	..	M							G

Marsilea, Linne (1735).

quadrifolia, *Linne*	..	..	F	C	S	M	A					G

Pilularia, Linne.

globulifera, *Linne*	...	...	...	S								

FILICES.

Ophioglossum, Linne.

vulgatum, *Linne*	...	...	C	S	W	M	A		Y		K	G

Botrychium, Swartz (1800).

ternatum, *Swartz*	...	...	...	...	...	A						

Schizaea, Smith (1791).

fistulosa, *Labillardiere*	...	...	...	...	...	A				K		
bifida, *Swartz*	...	...	...	...	...	...	...	...		...		G

Gleichenia, Smith (1791).

circinata, *Swartz*	...	...	...	...	...	A						

Osmunda, Linne.

barbara, *Thunberg*	...	...	...	...	...	A						

Dicksonia, L'Heritier (1788).

Billardieri, *F. v. Mueller*	...	...	...	...	A							G

Lindsaea, Dryander (1791).

linearis, *Swartz* ... ... A G

Adiantum, Linne.

Æthiopicum, *Linne* ... ... W A K G

Pteris, Linne (1735).

aquilina, *Linne* ... ... A N L K G
arguta, *Aiton* ... ... L G
incisa, *Thunberg*... ... ... G

Lomaria, Willdenow (1809).

discolor, *Willdenow* ... ... A K
lanceolata, *Sprengel* ... ... G
Capensis, *Willdenow* ... ... A K

Asplenium, Linne (1737).

flabellifolium, *Cavanilles* ... ... A N L G
furcatum, *Thunberg* ... ... G
bulbiferum, *Forster* ... ... G

Aspidium, Swartz (1800).

molle, *Swartz* ... ... M
decompositum, *Sprengel* ... ... G

Polypodium, Linne.

punctatum, *Thunberg* ... ... G

Grammitis, Swartz (1800).

Reynoldsii, *F. v. Mueller* ... F
rutaefolia, *R. Brown* ... ... F C S W A N Y
leptophylla, *Swartz* ... ... A N K

Cheilanthes, Swartz (1806).

tenuifolia, *Swartz* ... ... F C S W A N Y L K G
vellea, *F. v. Mueller* ... ... F C S W
distans, *Braun* ... ... W A N Y
Clelandi, *F. v. Mueller & Tate* ... W

———o———

This Flora includes:—

Orders 101, Genera 553, Species 1,935.

Definitions of Four New Species of Australian Plants.

By Professor Ralph Tate, F.L.S., F.G.S., &c.

[Read October 1, 1889.]

Cryptandra scabrida.*

Spyridium scabridum, R.T. coll.

An erect twiggy shrub of about three to four feet high. Leaves linear-oblong, about quarter inch long, somewhat clustered, deeply channelled above, the margins recurved, bluntly notched at the end; upper side scabrous and sparsely hispid; under side with long subappressed hairs. Flower-heads very dense, in compact terminal cymes, surrounded by a few floral bracts much larger and broader than the leaves, densely beset with white woolly hairs.

By the Eleanor River, and at Karatta, on the Stun'sailboom River, Kangaroo Island (*R.T.*, January 24, 1883).

This species is closely related to *C. halmaturina* and *C. bifida*, from which it differs by the shape of the leaves and the nature of the investiture. The differential characters of the three seem to be as follows:—

Leaves cuneate-oblong, lobes short blunt, densely stellately-hairy, underside also with long simple hairs. *halmaturina*

Leaves narrow-cuneate, lobes longer subacute, upper side glabrous or nearly so, underside densely beset with long hairs. *bifida*

Leaves linear-oblong, somewhat clustered, deeply channelled above, bluntly notched at the end; upper side scabrous and sparsely hispid, underside with long subappressed hairs. *scabrida*

Caladenia toxochila.†

A slender slightly-hairy species of about nine inches high; one-, rarely two-,flowered. Leaves oblong-lanceolate, about four inches long.

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* Upper surface of leaves *somewhat rough*.

† *Bow-shaped* lip or labellum.

Sepals and petals brownish-red, with a yellowish or greenish margin. Dorsal sepal erect, narrower than the lateral sepals, which are flat, lanceolate, gradually pointed, and slightly clavate at the tip, with a minute glandular pubescence, and about half an inch long. Petals narrower than the sepals, of about the same length, tapering to a fine point, without any glandular pubescence. Labellum on a long claw, flat, crescent-shaped with a broad triangular apical extension, marked with brown forked veins diverging from the base; the anterior margins fringed with narrow blunt denticles; colour greenish-yellow, the middle lobe dark-brown. Length, quarter inch; breadth, three-eighths of an inch. Calli on long stalks, clustered in the centre and at the base, or obscurely four-rowed. Column much curved, broadly winged in the upper two-thirds, nearly half inch long

Caroona Hill, 45 miles due west of Port Augusta (*Dr. W. L. Cleland*, August, 1889).

This species in its short petals and sepals resembles *C. Cairnsiana* and *C. reticulata*, but differs especially by the shape of the labellum.

Caladenia tentaculata.*

A slender nearly glabrous species from six to twelve inches high; one- or two-flowered.

Sepals and petals pale-brown with a narrow dark-centre, tapering into long filiform points, and densely beset with short reddish glandular hairs; from one and a half to two inches long.

Labellum narrow, ovate-rhomboid, slightly contracted towards the tip, sessile, without lobes, streaked with brown forked lines, anterior margins shortly and bluntly serrate, about quarter of an inch long and one-eighth in width. Calli in two rows extending from the base to about half the length of the labellum, traceable beyond as dark spots. Column very short, winged throughout, slightly curved, under quarter of an inch long.

Caroona Hill, 45 miles due west of Port Augusta (Dr. W. L. Cleland, August, 1889).

In general appearance this new species resembles *C. filamentosa*; but its labellmm is proper to the Section Phlebochilus, from other species of which it is distinguished by its filiform sepals and rhomboid labellum.

In the following synopsis I have set out the leading characters of the species of Section Phlebochilus; of which two inhabit south-west Australia—*C. discoidea*, Lindley, and *C. multiclavia*, Reichenbach; three South Australia, viz., *C. reticulata*, Fitzgerald, *O. toxochila*, Tate, and *C. tentaculata*, Tate; and *C. Cairnsiana*, F. v. M., is common to the two regions.

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* Having tentacles or feelers in reference to the sepals and petals.

KEY TO THE SPECIES OF CALADENIA (SECT. PHLEBOCHILUS).

Labellum-margin entire.

Calli in two rows; labellum orbicular, shortly stalked; sepals lanceolate shortly acuminate. *Cairnsiana.**

Calli crowded, lower ones connate; labellum broadly ovate or rhomboidal, long-stalked; sepals lanceolate, tapering into long fine points. *multiclavia.*

Labellum-margin ciliated, toothed or serrate.

Labellum ciliate-fringed, broadly ovate or orbicular.

Calli crowded; labellum contracted at the base; sepals subulate-acuminate. *discoidea.*

Calli in four rows; labellum short-stalked; sepals lanceolate, shortly-acuminate. *reticulata.*

Labellum toothed or crenate.

Calli in two rows; labellum narrow ovate-rhomboid, sessile, bluntly serrate; sepals subulate-acuminate. *tentaculata.*

Calli crowded or in four rows; labellum crescent-shaped with a short lanceolate middle lobe, on a long stalk, toothed; sepals narrow-lancoolate. *toxochila.*

Schœnus discifer.†

Dwarf, densely tufted perennial. Leaves radical, linear, erect, flat, longitudinally veined, under two inches long; leaf-sheaths short, membranous, reddish-brown, neither bearded nor pointed. Stem solitary, about one inch; spikelet two and a half to three lines long, solitary, terminal, erect, sessile, ovate-lanceolate, pale-coloured; the erect leafy involucral bract continuing the stem, about one inch long.

Flowers about three in each spikelet, the two lower ones fertile; glumes glossy, straw-coloured, membranous, with a prominent green keel, acute; hypogynous bristles absent; stamens three, as long as the style; style-branches three. Nut ovoid, three-ribbed, smooth, black, with white streaks and blotches, or white mottled with black, raised on a bluntly triangular lamelliform disk.

Wet heath-ground, Central Dudley Peninsula, Kangaroo Island (*R.T.*, November, 1883).

This species belong to the Section Oligostachyæ of Bentham's arrangement in the Fl. Austral., and is related through its hypogynous disk to the leafless *S. minutulus*. In habit it resembles *S. Tepperi*, but is distinguished by its flat and veined leaves, by its two fertile flowers, and by its smooth ovoid disk-bearing nut.

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* Since describing *C. caraiochila*, certain discrepancies in the diagnosis of *C. Cairnsiana* given in the Fl. Australiensis have been cleared away by reference to the original description; and it seems probable that the former name is synonymous with the latter.

† *Having a disk.*

Further Notes on Australian Coleoptera, with Descriptions of New Species.

By the Rev. T. Blackburn, B.A.

VI.

[Read October 1, 1889.]

The specimens on which the following notes and descriptions are founded have been recently acquired or determined by me. They are inhabitants of the colony of South Australia, with one exception—a *Novius* from N. S. Wales. As I had the honour of reading a paper last October before this Society on the Australian *Coccinellidæ* (including some new species of *Novius*), it seems convenient to describe the present one here, although isolated from the other species to which this paper relates by its place in the catalogue of *Coleoptera* as well as by its habitat.

CARABIDÆ.

ACROGENYS.

A. australis, sp. nov. Angusta; elongata; sat depressa; crebre (capite minus crebre) sat fortiter punctulata; supra pilis brevibus dense vestita; prothorace canaliculato, quam latiori paullo longiori; elytris postice truncatis, striatis, interstitiis sat planis. Long., $2\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l.

The antennæ are about half as long as the whole insect, and are very robust; all the joints are pubescent, the basal one scarcely half as long as the head, the rest all much shorter, the second shortest. The maxillary palpi are large and stout, with the apical joint elongate-triangular, the labial very small and slender with the apical joint cylindric. On the head an impression runs obliquely forward from either eye; these two impressions are connected by a transverse one in front, and are foveately deepened near their junction with it; from some points of view these deepened portions alone are noticeable, so that the head seems only bifoveate in front. The prothorax scarcely differs from that of *A. hirsuta*, Macl., except in being less strongly rounded in the front part of its sides, so that it is a little narrower in proportion to its length. The apex of the elytra is rotundate-truncate; none of their interstices are carinate. The puncturation of every part is a little less close and less coarse than in *A. hirsuta*.

Though so very much smaller than either of the previously described species of *Acrogenys*, I cannot doubt that this is a

member of the genus. Having only a single example I have not been able to dissect the parts of the head, and in so small an insect it is most difficult to see them clearly without dissection, but as far as I can see they are quite as in *A. hirsuta*. The only structural differences that I observe consist in the more abrupt truncation of the apex of the elytra and the greater bluntness, as far as I can observe it, of the median tooth of the mentum.

Adelaide district; in flood refuse of the Torrens.

DIABATICUS.

The following two species appear to belong to this genus, although its diagnosis (Cist. Ent. II., p. 324) is not very clear, unless one happened to possess a type of the American genus *Pinacodera*, with which it is compared, and unfortunately I have not such type, nor do I know of one in any Australian collection. Moreover, the expression "orbitu post-oculari rotundato-angustato" is obscure, and the sparseness of puncturation on the elytra can hardly be regarded as a generic character. The species before me seem however to be congeneric with *Plochionus australis*, Er., for which the genus was formed, and agree fairly with Bates' diagnosis as far as I can follow it, although I should scarcely call the claws "strongly" denticulated. The genus resembles *Phlœocarabus*, but differs *inter alia* in the shorter and stouter tarsi, smaller eyes, and elytra very much shorter in proportion to the head and prothorax.

[While this memoir has been in the printer's hands I have received from Mr. T. G. Sloane, of Sydney, some remarks on the generic affinities of these and other *Lebiides* on which I had asked his opinion. Mr. Sloane occupies a foremost place among the rising entomologists of Australia, and his residence in Sydney gives him the opportunity of consulting the oldest and best Australian collections; hence, I attribute considerable importance to his determinations. While disclaiming the ability to speak as a specialist on the *Lebiides*, he is disinclined to refer the following two species to *Diabaticus*, but is unable to refer them to any other described genus. As will be seen from my remarks (above) I think it quite possible that Mr. Sloane is right in this matter, but, nevertheless, it seems to me advisable to use the name *Diabaticus* for the present, rather than form a new genus closely allied to *Diabaticus*, especially as I can specify no good structural distinctive character. I think I have described the species under consideration sufficiently in detail to prevent any actual inconvenience arising from my having attributed them to a genus in which they can perhaps hardly maintain a permanent place.

I should add that Mr. Sloane tells me he cannot regard as genuinely pertaining to *Phlœocarabus* the South Australian spe-

cies that I have attributed to that genus, mentioning especially as distinctive of *Phlœocarabus* a much smaller second joint of the antennæ and a more *Xanthophœa*-like head. As Mr. Sloane has seen the insect on which the genus was founded I have no doubt he is right in the matter, but, nevertheless (as I pointed out in a paper read last week before the Linnean Society of N. S. Wales) these South Australian species agree very well with the published characters of *Phlœocarabus*, so that they can hardly be furnished with a new generic name except after a re-characterising of *Phlœocarabus*. Mr. Sloane's courtesy in making these comparisons however enables me to perceive the need of pointing out that my allusion to *Phlœocarabus* above refers to the South Australian species which I have attributed to that genus, and might possibly not apply to the original type.]

D. tumidiceps, sp. nov. Elongatus, capite prothoraceque conjunctis elytris vix brevioribus; glaber; sat nitidus; obscure rufescens, elytris piceo-umbratis, antennis, palpis, pedibus, meso- et metasternis abdomineque, testaceis,-hoc ad latera piceo-maculato; capite pone oculos fortiter dilatato; hoc prothoraceque sparsim subtiliter punctulatis et subtiliter transversim rugatis; elytris sat fortiter striatis, interstitiis vix convexis minus sparsim punctulatis, postice rotundato-truncatis. Long. $3\frac{1}{5}$ l.; lat. 1 l.

Antennæ less than half as long as the whole insect, moderately robust, the second joint shorter than the rest, which are subequal. The head is subparallel, and scarcely narrower than the prothorax, and is longer (from the base to the apex of the labrum) than it is wide, being as wide across the post ocular dilatation as across the eyes; there is a deep impression on either side at the inner front corner of the post ocular dilatation from which a furrow runs forward just within the eye, and curves forward across the head between the antennæ, in front of which the surface of the head is uneven. The prothorax is fully as long as wide, subtruncate in front, with the dorsal channel strong but abbreviated at both ends, the anterior angles quite rounded off, the sides very finely margined, roundly divergent hindward immediately behind the base and then gently convergent and almost straight to the base, which is narrower than the widest part of the segment by about a third part of the width of the latter; the hind angles are subdentiform, with the adjacent surface a little explanate; the anterior curved impression is very strong, the base rather strongly lobed in the middle. The elytra are widest behind the middle, where they are nearly twice as wide as the widest part of the prothorax; there are two large punctures on the third interstice. The mentum is strongly toothed;

the apical joint of the labial palpi is moderately securiform in the male, that of the maxillary being elongate, subcylindric, and truncate at the apex; the tarsi are moderately broad, glabrous, and nitid above, the joints of almost equal width, the fourth somewhat emarginate at the apex.

Port Lincoln; among débris on swampy ground, not common.

D. minor, sp. nov. Sat elongatus; capite prothoraceque conjunctis elytris parum brevioribus; glaber; sat nitidus; rufescens vel testaceo-rufus; capite, elytrorum umbris nonnullis, et sternorum abdominisque maculis nonnullis, piceis vel rufo-piceis; capite obsolete sat sparsim punctulato, pone oculos sat fortiter dilatato; prothorace sat fortiter transversim rugato; elytris subtiliter striatis, interstitiis sat planis, obsolete sparsim punctulatis, postice truncatis. Long., $2\frac{3}{5}$ l.; lat., $\frac{4}{5}$ l. (vix).

Head oval, a little narrower than the prothorax, scarcely so long as wide, and a little wider across the eyes than across the dilated part behind them. There is an obscure impression on either side between the antennæ. Prothorax nearly half again as wide as long, subtruncate in front; the dorsal channel fine, lightly impressed, and abbreviated at both ends; the anterior angles quite rounded off; the sides narrowly margined, moderately rounded and scarcely sinuate behind, but with the hind angles minutely subdentiform, the widest part about half again as wide as the base, which is moderately lobed in the middle, the anterior impression moderately defined. The elytra are about one-fifth again as long as the head and prothorax together, and about one-third again as wide as the prothorax, the widest part being near the apex. The puncturation of their interstices is much feebler than in *D. tumidiceps*.

Port Lincoln, in company with the preceding.

PHORTICOSOMUS.

P. robustus, sp. nov. Piceo-brunneus; antennis palpisque manifeste, pedibus vix, dilutioribus; antice leviter bisinuato, postice quam antice vix latiori, angulis posticis acutis subdentiformibus; elytris postice adlatera sinuatis, fortiter striatis, interstitiis sat convexis. Long., 7 l.; lat., $2\frac{4}{5}$ l.

Head (across the eyes) slightly narrower than the base of the prothorax; the latter half again as wide as its length down the middle, at its widest in front of the middle; the front margin and base of almost equal width, the front margin moderately concave and gently bisinuate; the front angles much rounded, and not at all produced forward as they are in *P. mucronatus*, Blackb.; the central channel moderately impressed, and at both ends much

abbreviated ; the sides strongly sinuated immediately before the hind angles, which are scarcely less dentiform than those of *P. mucronatus ;* the reflexed margin narrow, as in *P. brunneus* (narrower than in *mucronatus*); the surface transversely depressed in front of the disc, as in *brunneus*, Blackb., and with a curved anterior impression, also as in *brunneus*. The sculpture of the elytra is very similar to that of *P. brunneus* and *felix*, Schaum., except that the interstices are more convex.

The already-described species of *Phorticosomus*, neither very much larger nor very much smaller than this, and having the posterior angles of the prothorax sharply rectangular or subdentiform, are *similis*, Blackb. (this is a good deal smaller) and *mucronatus*. Both these have the elytral striæ very much feebler and the interstices flat. *P. mucronatus* also has the clypeus much less rugose, and the sides of the elytra very much more strongly sinuate near the apex.

South Australia ; I am uncertain of the exact locality.

PSELAPHIDÆ.

CTENISTES.

C. Adelaidæ, sp. nov. Rufescens; antennis elongatis; prothorace antice angustato, postice fovea magna impresso ; elytris prothorace dimidio longioribus ; oculis sat magnis.

Maris (?) metasterno profunde longitudinaliter sulcato ; antennis elytrorum apicem attingentibus, articulis 1-7 conjunctis quam articuli 8-11 conjuncti multo brevioribus, articulis 8-10 gradatim brevioribus, articulo 11° quam 9$^{us.}$ et 10$^{us.}$ conjuncti vix breviori, apice oblique truncato. Long, $\frac{2}{3}$ l.

This species is, no doubt, rather close to *C. parvus*, Shp., which it resembles in the long antennæ (reaching the apex of the elytra when set back), the well defined simple fovea of the prothorax and the elytra about half again as long as the prothorax. The antennal joints, however, are very different in their proportions *inter se* ; the 10th joint being much longer than wide, and the 11th barely equal (not to the preceding three together but) to the preceding two. These antennal differences might be sexual, but they are accompanied with certain other distinctions, the eyes in the present species being by no means exceptionally small, and the elytra being rather strongly dilated behind—which seem quite inconsistent with specific identity. From *C. impressus*, Shp., the present species may be known *inter alia* by the prothorax being as long as wide, and scarcely narrower at the base than in the middle, and having a simple fovea, from *C. simplex*, Shp., by its long antennæ and non-transverse prothorax, from *C. vernalis*, King, and *C. Kreusleri*, King, by the very different antennal structure, although it is possibly the previously undes-

cribed sex of the latter (as the size and the antennal structure of the one sex are really the only distinctive characters mentioned in the description of that species), the size of which, however—said to be less than half a line—seems to point to distinctness, and moreover I have another species (mentioned below) which agrees much better with the description.

In flood débris near Adelaide.

C. Kreusleri, King. In flood débris of the Torrens I have taken both sexes of a *Ctenistes*, which I believe to be this species. The distinction between the sexes seems very slight except in respect of the antennæ. The sex that I take to be the male has the apical four joints of the antennæ together equal to the basal seven together, and forming a distinct club in which joints eight-ten are somewhat equal in length, and gradually increase in width, joint eleven being wider still, slightly longer than nine and ten together, and obtusely narrowed at the apex; the second ventral segment is scarcely longer than the following segments together, and bears an obscure impression slightly in front of its apical margin. In the other sex the apical four joints together of the antennæ are considerably shorter than the basal seven together, and are successively thickened, joint 8 being same length as 9, 10 scarcely shorter than the preceding two together, 11 scarcely shorter than the preceding three together; and the second ventral segment is decidedly longer than the following segments together and has no impression. The whole insect is of a very uniform pale castaneous colour, it is closely and rather coarsely asperate-punctulate, and somewhat closely clothed with short, crisp, whitish hairs. The prothoracic fovea appears somewhat forked in front. The antennæ are short (reaching back to about the middle of the elytra), and the eyes are much smaller than in *C. Adelaidæ*.

C. tenebricosus, sp. nov. (? female). ♀ Brunneo-niger; antennis sat brevibus; prothorace antice angustato, postice fovea magna impresso; elytris prothorace dimidio longioribus; oculis sat parvis. Long., $\frac{2}{3}$ l. (vix).

This species differs from all yet described as Australian of the genus, by its uniform blackish colour. It is more finely and sparsely punctured than *C. Kreusleri (?)*, and therefore more nitid; like that species it is clothed with short, crisp, whitish hairs. The prothorax is scarcely so long as wide, with a deep posterior fovea not at all forked in front, the general surface of the segment being even. The elytra are considerably narrower at the shoulders than behind. The antennæ scarcely differ in structure from those of the specimen which I regard as the female of *C. Kreusleri*.

Port Lincoln; in moss,

ARTICERUS.

A. asper, sp. nov. Ferrugineus, antennis pedisbusque testaceis, supra (abdominis basi nitida sparsim punctulata transversim profunde excavata excepta) subopacus, crebre aspere punctulatus; capite prothorace elytrisque obscure pubescentibus; antennis valde depressis, quam latiores parum longioribus, supra parte dimidia basali longitudinaliter impressa; capite quam antennæ vix longiori; prothorace fortiter transverso haud foveolato. Long., 1.l. (vix).

The antennæ are not much longer than wide on their flattened face, both sides of which are strongly rounded in outline, but the middle of the curve is on the outer side, a little nearer to the apex than on the inner side.

Of the other described species having antennæ impressed above, *Pascoeus*, Shp., has the prothorax not transverse; *aurifluus*, Schauf., has the inner margin of the antennæ straight, and *brevipes*, Shp., has the elytra punctured only indistinctly.

A single specimen was taken by me in flood refuse near Adelaide.

BYRRHIDÆ.

BYRRHUS.

I see no good structural character to prevent the following species being considered a true *Byrrhus*, although it should be noted that I have not been able to devote a specimen to dissection. It differs from the typical forms of the genus in having the body somewhat densely and evenly bristling with long erect hairs, and having the incrassation of the antennæ commencing only at the seventh joint. These latter consist of 11 joints, and are inserted, as in *Byrrhus*; the head is retracted in repose, but in such fashion that the eyes and labrum are visible (the former only in part); all the tarsi are laid stiffly back in repose against their tibiæ, which, however, are channelled by no means deeply for their reception. The apical joint of the maxillary palpi is somewhat more elongate and conic than in most species of *Byrrhus*.

B. Torrensensis, sp. nov. Oblongo-ovatus; nitidus; crebrius subtilius punctulatus; pilis longis nigris erectis sat dense vestitus; supra nigro-æneus, prothorace obscure viridi; subtus rufus vel piceo-rufus, antennis (clava picea excepta), palpis, labro, pedibusque, testaceis. Long., 1-1$\frac{3}{5}$ l.; lat., $\frac{3}{5}$-1 l.

The antennæ, if set back, would about reach the base of the prothorax; joint 1 is stout, and about as long as 3, 2 is very short, 3 nearly as long as 4, 5, and 6 together, the latter three subequal, and scarcely longer than wide, 7-11 forming a well-defined club.

Two specimens occurred to me in flood-refuse on the banks of the River Torrens.

ELATERIDÆ.

TETRALOBUS.

T. Fortnumi, Hope. I have lately received a male example of this genus taken by Mr. Read near Lake Eyre, which seems to be quite distinct from any species previously seen by me. It is broad in proportion to its length (long., 13 l. ; lat., 4 l.), and its prothorax, instead of being more or less canaliculate down the middle, has a very faintly *raised* shining dorsal line. But the character on which I rely for specific distinctness consists in the structure of the antennæ in the male, the branches of which are much shorter than in any other *Tetralobus* I have seen, the longest of them being no longer than the distance between the antennæ at their base. The antennæ, moreover, are very short as a whole, reaching when laid back not further than to the front of the basal quarter of the prothorax. The colour of the insect is dark chestnut, the legs and antennæ (except the basal joint) being paler. The prothorax is (across the hind angles) exactly as wide as it is long down the middle. The elytra are very distinctly punctulate-striate, but the puncturation becomes feebler, and the striæ are obsolete near the apex. The interstices are feebly convex in the front half, and are punctured more sparingly than in any other *Tetralobus* that I have seen. The prothorax has the usual fovea on either side of the middle line near the front strongly marked.

As there are several descriptions of species of *Tetralobus* which scarcely mention more than generic characters it is very likely that this insect has already received a name, and it appears to me not at all unlikely to be *T. Fortnumi*, Hope. The only difficulties in so regarding it are that *T. Fortnumi* should be a somewhat *narrower* insect, and is said to have the longitudinal line of the prothorax "parum impressa ;" whereas in the specimen before me it is "haud impressa." This latter character, however, is probably variable (judging from other species of *Tetralobus*), and as it seems that *T. Fortnumi* is quite incapable of certain identification, and the measurements given by its author may be a trifle inexact, I think it will be well to assign the name to this insect, at any rate until some fresh evidence to the contrary may be forthcoming.

T. Manglesi, Hope. There are before me specimens of an insect belonging to my own collection and to those of the Adelaide Museum and of the Adelaide University Museum, taken in various parts of South Australia, which, I think, may be regarded as this species. Like most of its congeners, the species varies greatly in size, the smallest examples being long., 12 l., lat., 3½ l. ; the largest long., 17 l., lat., 5 l. It is accordingly one of the widest of the genus in

proportion to its length. It is also characterised by the elytra being (not gradually narrowed from the base to the apex, but) slightly narrowed immediately behind the base, and then lightly dilated again, so that they are very slightly wider just before the apex than at any other part. The prothorax is just barely wider across the hind angles than its length down the middle, and immediately in front of the middle it is in both sexes almost or quite as wide as across the hind angles, which are only very slightly produced hindward or outward, the sides being gently sinuate. It is very closely and quite rugulosely punctulate in front, less so behind. Its dorsal channel is extremely feeble in the examples before me, and the lateral foveæ are only slightly marked. The front angles are more or less feeble and rounded. The elytra are distinctly striate, the striæ irregularly punctulate, the external ones having stronger and larger punctures than those near the suture, all the striæ and their punctures becoming more or less obsolete towards the apex. Each apex is separately and feebly rounded, the suture ending in a very small spine. The interstices are more or less closely punctured, more strongly in the male than the female. The sides of the prosternum are very strongly and sparingly punctured—(this is a highly distinctive character, and does not seem to vary). The antennæ of the male are shorter than in the large common South Australian species (*T. Australasiæ*, or possibly *Murrayi* if the two are really distinct), and the individual branches of the same are also shorter, though they are very distinctly longer than the distance between the bases of the antennæ. The tarsi also are notably shorter, especially in the male.

From *T. Fortnumi* (*vide* "supra") it differs chiefly in being much less attenuate behind, with the prothorax less rugulose dorsally; the sides of the prosternum much less closely punctulate; the branches of the antennæ in the male considerably longer, and the apical spines of the elytra much feebler.

TENEBRIONIDÆ.

LEPISPILUS.

L. rotundicollis, sp. nov. Oblongus; convexus; piceus; maculatim flavo-pubescens; prothoracis lateribus sinuatis, latitudine paulo ante medium quam trans basin haud minore. Long., 8 l.; lat., $3\frac{3}{5}$ l.

Differs from *L. sulcicollis*, Boisd., in the form of the prothorax, which is (by measurement) very nearly twice as wide as long (as 13 to 7 in the example before me), with the front about two-thirds the width of the base, the sides strongly convex in outline immediately behind the front, and from the middle to the base almost as strongly concave, so that the greatest divergence is at

the base and at a point a little in front of the middle. The closely punctulate depressions on the elytra bearing yellow pubescence are very shallow and very large, and are very irregularly placed, so that the nitid interspaces form an ill-defined and extremely open network, none of them appearing as continuous longitudinal costæ, even that nearest to the suture being more or less interrupted. It is not improbable, however, that there may be some variation in this respect if in some examples the depressed spaces happen to fall more into longitudinal lines. The average area of these closely punctured depressed spaces is about equal to that of the eye as seen from above, but in places two or three of them almost coalesce, so as to form what on a casual glance looks like a very large space indeed.

A single example in the South Australian Museum is ticketed "C. A." (Central Australia). Other specimens similarly ticketed seem to be from the southern part of the tropical region.

MELOIDÆ.

ZONITIS.

Z. nigro-ænea, Fairm., var. (?) *A*. Nigra; clypeo antice obscure piceo; elytris cœruleis, crassissime rugulose punctulatis, interstitiis haud lævigatis. Long., 6 l.; lat., $1\frac{1}{5}$ l.

The antennæ are two-thirds the length of the body; joint 1 is slightly longer than 4, 2 scarcely half as long as 1, and two-thirds the length of 3. The head is equal in length to the prothorax, and also to the first four joints taken together of the antennæ; the distance from eye to eye is rather more than the length of the basal joint of the antennæ, or about one-third the length of the head. The labrum is nearly as long as the basal joint of the antennæ, ciliated in front and deeply channelled down the middle, its surface shiny, with a few strong punctures. The clypeus is truncate in front, its hind suture strongly angulated: its surface is shining and only obscurely punctulate, a deep furrow crossing it near its base, its length about equal to that of the labrum. The hind part of the head is strongly and somewhat rugosely punctulate, and almost truncate behind. The prothorax down the middle is barely longer than its greatest width, which is slightly behind the middle; its base is about a quarter again as wide as the base of the head; the width of its front is about one-third of its base, from which the sides diverge sinuously not quite to the middle, where they are strongly rounded, and thence converge sinuously to the front; the front part of the suface is a little depressed; from this depressed space a very strong central channel runs back to the base, and on either side of the channel there is a large deep fovea on the disc. The scutellum is nitid, and very sparsely, but not finely, punctulate. The elytra are

extremely coarsely foveolate-punctulate, the instertices quite confused, with no tendency to a linear arrangement, and bearing confused punctures and wrinkles. In the male the basal three ventral segments are carinate down the middle, and the fourth is strongly and widely emarginate at the apex. The underside is rather closely (least closely on the hind body), squamosely, and finely punctured, and is densely clothed with black pubescence, the upper surface being glabrous.

Seems to be near *Z. nigro-ænea*, Fairm., but is larger, with the hind body of the male carinate (not "longitudinally impressed"), and with the scutellum and the elytral interstices punctulate.

If M. Fairemaire's description of *Z. nigro-ænea* can be relied upon, the insect described above is probably a distinct species. But unfortunately that author's "Revision des Zonitis d'Australie" contains errors (perhaps of the printer) which render it unsafe to give new names to species that seem closely allied to those that are described in it. In the description of *Z. indigacea (e.g.)* we read of the antennæ "articulo 2° tertio paulo longiore," but further on *indigacea* is distinguished from *nigro-ænea* by "the second joint notably shorter than the third."

Port Lincoln.

Z. Andersoni, sp. nov. ♀ Nigra, capite (labro excepto) rufo, elytris (apice excepta) testaceis, prothorace pedibusque brunneo-piceis; capite antice minus producto; elytris crebre subtilius punctulatis, obsolete costatis. Long., $7\frac{1}{2}$ l.; lat., $2\frac{1}{5}$ l.

The antennæ are about half as long as the whole body; joint 1 is rather short (little more than half as long as the distance between the eyes), 2 scarcely longer, 3 slightly longer still, 4 still longer (nearly half again as long as 1). The head is triangular, scarcely longer than the width of its base, which is gently arched hindward, its length about equal to that of the basal four joints of the antennæ together. The labrum is about as long as the clypeus (the two together being less than half as long as the rest of the head), its front portion declivous, its front margin ciliated, its surface feebly and sparingly punctulate and hairy, without any furrow. The hinder part of the clypeus is flat and horizontal, with a defined margin or ridge, the portion in front being declivous; the hind suture is feebly arched, its surface obscurely punctulate (most strongly on the ridge). The hinder part of the head is punctured rather strongly in front, very obscurely behind, with a feeble central longitudinal furrow running forward for a short distance from the base. The prothorax is scarcely wider than long, its front margin about a third as wide as the base and as the hind margin of the head; its sides diverge slightly and

scarcely sinuously to about the middle, where they are feebly rounded, and whence they converge bisinuately to the front; its surface is very finely and sparsely punctured, the front portion depressed; there is an interrupted and rather feeble channel down the middle of the hinder half; the base is very gently arched hindward; scutellum smooth behind, punctured in front. The elytra are closely, evenly, and rather finely punctulate, and bear (besides the raised suture) distinct traces of three or four costæ, which almost reach the apex. The metasternum is faintly punctulate, and bears a short, close, erect pile; the ventral segments are nitid, glabrous, and almost lævigate.

The bright red head, dark red-brown shining prothorax, and testaceous semi-opaque elytra, with their apex black, will render this species easy to recognise.

Allied to *Z. tricolor*, LeG., but (apart from colour) differing in its much shorter head, differently shaped clypeus and labrum, prothorax very much narrower in front, &c.

Port Lincoln; taken by Mr. J. Anderson.

Z. brevicornis, sp. nov. Rufa; antennis, palpis, mandibulis apice, femoribus anticis antice in medio, tibiis (basi exceptis), tarsis, macula in capite, maculis in prothorace 2, metasterno (episternis exceptis) et abdominis parte, piceo-nigris; elytris cæruleis, crebre subtilius (postice crassius) punctulatis; capite antice minus producto; prothorace antice minus angustato. Long., 5 l.; lat., $1\frac{4}{5}$ l.

The antennæ are about half as long as the whole body; joint 1 is short (scarcely as long as half the distance from eye to eye); 2, shorter still; 3 and 4 subequal, each of them equal to the basal joint. The head is not very triangular in shape, its length and breadth about equal, its length a little greater than that of the basal four antennal joints together. The labrum is scarcely so long as the clypeus (the two together not quite half as long as the rest of the head), its surface devoid of a dorsal furrow, strongly punctulate, its front ciliated. The clypeus is strongly punctulate, its hind suture strongly arched. The surface of the hind part of the head is punctulate strongly in front, and gradually less strongly hindward, and bears between the eyes a large piceous blotch, which is slightly protuberant and lævigate in the middle; the hind margin of the head is almost truncate. The prothorax is very slightly shorter than the head, very slightly wider than long, and equal in width to the hind margin of the head; its front margin (which is emarginate) is nearly half as wide as its base; its sides are gently and somewhat evenly arched, their greatest divergence being in front of the middle; its surface is strongly and very sparingly punctured, with some feeble indica-

tion of a dorsal channel a little in front of the base, and with a distinct round piceous discal blotch on either side a little in front of the middle. The elytra are closely subrugosely and rather finely punctured, the punctures much mixed up with a system of reticular wrinkling. The upper surface (saving some hairs on the labrum) is glabrous. The underside is distinctly, though rather lightly and squamosely, punctured; the metasternum bears a short erect closely-set pile. The claws are red. The middle tibiæ are strongly, almost angularly, bent (perhaps in the male only). The hind body is piceous, but bears a yellow patch (successively larger on each segment from the base) on either side of each segment. In the male the ventral segments are carinate all down the middle.

This species should fall, I think, into M. Fairemaire's first division of the genus, and will be the only species therein yet described having unicolorous blue elytra; its short thick antennæ also will distinguish it. A very old and faded example in the South Australian Museum seems to be identical, although the black spots on the head and prothorax are wanting.

Port Lincoln.

Z. cyanipennis, Pasc. The description of this species occupies four lines in the "Journal of Entomology." True, it is accompanied by an uncoloured figure, but, unfortunately, the figure appears to have been taken from a specimen with its head tucked down among the sterna, and gives little information beyond what the brief description furnishes; indeed, it rather presents a contradiction, for whereas the size given after the description is 6 l., the indicator in the plate gives $4\frac{3}{4}$ l., M. Fairemaire has provided a fuller description of an insect in his collection which he alleges (without specifying his authority) to be *cyanipennis*, Pasc., and gives its length as $8\frac{1}{2}$ mm., which means, I suppose, $4\frac{1}{4}$ l. I think M. Fairemaire's identification is possibly incorrect, both because he describes the colour (which appears to me remarkably constant in the metallic Zonites) differently from Mr. Pascoe, calling the elytra "blue-green" instead of "dark indigo-blue;" and because he says that the humeral calli are almost lævigate, which (if my identification of *Z. cyanipennis* is correct) certainly is not the case. Mr. Pascoe makes no allusion to the puncturation of any part of *cyanipennis*, so this important character gives no assistance. I have before me two specimens from Melbourne (the locality of the original type) coloured as *cyanipennis* is said to be, except in having the mesothoracic epimera yellow (of the length 6 l.). One of these—a female—agrees with Mr. Pascoe's figure in the shape of the elytra at the apex. The other (length, 4 l.) is a male, and seems perfectly identical with the larger specimen, except in respect of what appear to be sexual characters, viz.,

the antennæ are more slender (three-fifths the length of the whole body); the elytra are more narrowed, and are separately rounded at the apex, and the ventral segments are different, the basal three being compressed into a keel down the middle, and the fourth triangularly depressed in the middle.

The head in the insect which I take to be *cyanipennis*, Pasc., is nearly twice as long as its width across the base ; the labrum is quite as long as wide, is depressed down the middle, and bears a few strong setiferous punctures. I do not find any distinct separation between the hinder part of the head and anything that can be called a clypeus. The middle of a straight line drawn from the front of the labrum to the hind margin of the head would fall decidedly in front of the base of the antennæ. The antennæ are broken in the female example before me ; joint 1 is unusually long (equal to the basal joint of the front tarsi, and much more than half as long as the distance from eye to eye); 2, half as long as 1 ; 3 and 4 successively increasing in length ; but even 4 distinctly shorter than 1. The prothorax is scarcely longer than the head, is a little (to the eye it looks a good deal) longer than its greatest width, and is at its front margin rather more than a third the width of its base. The elytra are scarcely punctulate, but appear shagreened with fine vermiculate rugulosity somewhat as in *Z. rustica*.

Z. rustica, sp. nov. Rufa ; antennis, palpis, mandibulis, femoribus apice, tibiis, tarsis, capite toto, metasterno (episternis exceptis), et abdominis segmentis primis 3, nigris ; elytris cœruleis, crebre subtilius punctulatis, capite antice producto gradatim angustato ; prothorace fortius crebrius punctulato, antice sat fortiter angustato. Long., $4\frac{1}{2}$ l. ; lat., $1\frac{3}{5}$ l.

The antennæ scarcely exceed the length of half the body ; joint 1 is short (less than half as long as the distance from eye to eye), 2 scarcely half as long as 1, 3 slightly shorter than 1, 4 slightly shorter than 3. The head is very slightly longer than its width across the eyes, with its hind margin convex hindward ; it is gradually narrowed forward so as to be rather pointed in front, its width across the base of the mandibles is little less than half its width across the eyes ; its whole surface, including the labrum, is evenly, strongly, and rather closely punctulate, except that the puncturation becomes finer and feebler near the hind margin ; the labrum is rather strongly transverse, is clothed with long hairs, and bears a deep central fovea, much abbreviated in front. The prothorax is of the same length as the head, slightly longer than its greatest width, its front margin about half as wide as its base, its sides somewhat evenly rounded (scarcely perceptibly sinuate both in front of,

and behind, the middle), its greatest width (which is at the middle) scarcely exceeding the width of the head across the eyes, its surface evenly, somewhat strongly, and rather closely punctulate, with obscure traces of the middle part of a longitudinal dorsal furrow. The elytra on close examination are seen to be finely punctulate, but their readily noticeable sculpture consists of a confused system of wrinkling, making them appear finely shagreened, or coarsely coriaceous. To specify the degree of this sculpture by comparison with a familiar species, I may say that the general effect of the sculpture is a little less rough and strong than that on the elytra of *Z. bicolor*, Le G. The upper surface is glabrous or nearly so, the underside and legs densely clothed with short hairs. The claws are red, the ventral segments are coarsely, squamosely, and rather closely punctulate.

South Australia.

Z. Murrayi, sp. nov. ♂ Rufo-testacea; labro, palpis, antennis (basi picescenti excepta), femorum apice, tibiis, tarsis, metasterno (episternis exceptis), et abdominis segmentis basalibus 5 (5i apice rufo excepto), nigris; elytris læte cœruleis; capite nonnullis exemplis antice infuscato; hoc fortiter minus crebre punctulato antice minus producto minus angustato; prothorace canaliculato vix perspicue punctulato, antice sat fortiter angustato; elytris minus subtiliter vermiculato-punctulatis. Long., 5 l.; lat., $1\frac{2}{5}$ l.

The antennæ are about three fifths of the length of the whole body; joint 1 is piriform and strongly curved, in some examples testaceous, decidedly shorter than in *Z. cyanipennis*, scarcely longer than half the distance between the eyes, about as long as in *Z. rustica*, but much more strongly curved, joint 2 about one-third shorter, 3 equal to 1, 4 scarcely so long as 3. The head from the front of the labrum to the base is scarcely longer than its greatest width, the front part nearly parallel-sided; the middle of a line joining the front of the labrum, and the base of the head would fall between the insertions of the antennæ; the labrum is transverse and sulcate down the middle; the clypeal suture is quite undefined. The prothorax scarcely differs from that of *Z. cyanipennis*. The sculpture of the elytra is on the same plan as in *Z. cyanipennis* and *Z. rustica*, but is stronger, coarser, and less close than in either of them. The specimens before me appear to be all males, but (as usual in this genus) the soft hind body has become so much distorted in drying that its shape is not the same in any two. The first four or five ventral segments are compressed into a keel, which, however, does not always run down the exact middle line; the fifth is very feebly concave all across at the apex. The

ventral segments are very nitid, strongly and sparsely punctulate, and only thinly pubescent. The middle tibiæ are very strongly compressed and strongly curved; much more so than in *Z. cyanipennis*. The head is quite four-fifths as wide as the widest part of the prothorax.

Evidently must stand near to *Z. cyanipennis*, from which it differs in the yellow head nearly as wide as the prothorax, more coarsely sculptured elytra, much more nitid, strongly punctulate, and less pubescent ventral segments, &c.

Murray Bridge (South Australia); taken by Mr. Tepper.

Z. gloriosa, sp. nov. Piceo-brunnea obscure rufescens, elytris antice viridibus postice purpureo-violaceis; capite antice valde producto subtilius crebrius (disco lævi excepto) punctulato; prothorace vix perspicue canaliculato, leviter nec crebre vix subtiliter punctulato, antice rotundato-angustato; elytris subtiliter sat crebre nec rugulose punctulato. Long., 7 l.; lat., 3 l. (vix).

Considerably dilated behind. The apical part of the antennæ has been broken off the example before me; joint 1 equals 3, and is rather longer than 2 and shorter than 4. The head is more than one-third again as long as at the base it is wide, the front part parallel-sided; the middle of a line joining the base of the head and front of the labrum would fall considerably in front of the antennæ; the labrum is nearly as long as wide, its surface punctulate and longitudinally sulcate. The prothorax is slightly wider than long; its base is truncate, from which the sides diverge very slightly in nearly straight lines to immediately in front of the middle, where they are rounded, and whence they converge in a strong curve to the front, which is about half as wide as the base, but viewed from above the sides seem to pass into the front in a continuous curve; the surface bears no inequalities, except a barely discernible longitudinal furrow, which is abbreviated slightly in front. The puncturation of the elytra is considerably finer and less close than in *Z. tricolor*, Le Guill., and is not at all rugulose. The prothorax is slightly wider than the head, and scarcely half as wide as the widest part of the elytra. An obscure costa runs obliquely from close within the shoulder to the middle of the disc of the elytra.

Seems to resemble *Z. splendida*, Fairm., but that species is said to have a short triangular head, and the prothorax lœvigate. The present species has the head exceptionally elongate—the anterior part being almost absolutely parallel-sided—and the prothorax distinctly punctured. It appears to me structurally nearer to *Z. cyanipennis*, Pasc., than to any other previously described species.

Port Lincoln district; taken by Mr. J. Anderson.

COCCINELLIDÆ.

NOVIUS.

N. ruber, sp. nov. Breviter ovalis; sat nitidus; pubescens; sanguineo-ruber, subtus distincte, supra vix perspicue, hic illic infuscatus; tarsis picesentibus; capite prothoraceque vix perspicue, elytris crebre subtilius, punctulatis. Long., $1\frac{1}{2}$ l.; lat., $1\frac{1}{5}$ l.

Much like *N. bellus*, Blackb., in form and sculpture, but decidedly larger, and very differently coloured. The whole upper surface is of a shining bright-red colour, almost like sealing-wax. On close inspection a little vague infuscation can be discerned running down the side of each elytron a little within the margin in the front half, and occupying the neighbourhood of the inner apical angle.

N. cardinalis, Muls., is a still larger species with the head black and the prothorax and elytra bearing conspicuous black markings. *N. sanguinolentus*, Muls., has the head, prothorax, and scutellum black. The upper surface of *N. Lindi*, Blackb., is entirely black, except a large red spot on each elytron. *N. cardinalis*, Muls., and *bellus*, Blackb., agree in having both prothorax and elytra red, with black markings; but the pattern of either is very different from that of the other.

Sent to me by Mr. T. G. Sloane; taken by him, I believe, at Mulwala, N.S.W.

ERRATUM.

Tr. Roy. Soc., 1887, p. 224, lines 7, 24, 28, 29, and 33, for "*Lindi*" read "*Sharpi*."

Notes on the Geographical Distribution of Australian Characeæ.

By Baron Sir F. von Mueller, F.R.S., &c.

[Read August 6, 1889]

The following brief indications of the geographic range of various Australian Characeæ, which are additional to what is recorded in vol. xi. of my Fragm. Phytogr., Austral., pt. II., pp. 43-44, are from the researches of Dr. O. Nordstedt, chiefly through material communicated from the Melbourne Phytologic Museum :—

Chara contraria, *Al. Br.*:—Victoria; South Australia (Lake Bonney, *Miss Wehl;* Kangaroo Island, *O. Tepper).*

Chara coronata: — Victoria; Queensland; South Australia (Pidinga, *W. Tietkins).*

Chara dichopitys :—Victoria and New South Wales.

Chara fragilis, *Desv.* :—W. Australia; New South Wales; Queensland.

Chara gymnopitys, *Al. Br.* :—S. Australia (Kangaroo Island, *O. Tepper);* V.; N.S.W.; N.A.

Chara gymnopus :—W.A.; T., V.; N.S.W.; Q.; N.A.

Chara leptopitys, *Al. Br.* :—S.A. (Lake Bonney, *Miss Wehl);* Victoria.

Chara macropogon, *Al. Br.* :—W.A.; Q.; S.A. (Kangaroo Island, *O. Tepper).*

Chara Muelleri, *Al. Br.* :—Victoria.

Chara submollusca, *Nordstedt* (n. sp.) :—Queensland.

Nitella conglobata :—W.A.; V.; N.S.W.; Q.; N.A.

Nitella cristata:—S.A. (Tatiara-country, *C. Walter);* T.; N.S.W.; Q.

Nitella diffusa :—Victoria; New South Wales.

Nitella gracilis :—S. Australia (Murray River, *F. v. M);* Victoria.

Nitella Gunnii, *Al. Br.* :—V.; N.S.W.; Q.

Nitella hyalina :—W.A.; V.; Q.; N.A.

Nitella interrupta :—S.A.; T.; V.; N.S.W.; Q.

Nitella leptostachys, *Al. Br.* :—S.A. (among Todeas above the cataract of Mount Lofty, *F. v. M.*, 1848).

Nitella microphylla, *Al. Br.* :—W.A.; T.

Nitella myriotricha, *Al. Br.* :—S.A. (Murray River).

Nitella polyglochin :—Queensland.

Nitella Sonderi, *Al. Br.* :—N.S.W.; N.A.

Nitella Tasmanica, *F. v. M.* :—Victoria; Queensland.

Notes on Australian Fungi.

Collated by J. G. O. Tepper, F.L.S.

[Read August 6th, 1889].

List of Fungi, New or Rare for South Australia.

The following species were collected by Mr. J. G. O. Tepper, and named by Prof. P. Andrea Saccardo, of Padua, through the kindness of Dr. F. Ludwig, Germany :—

Uromyces Tepperianus, *Sacc., sp. n.* On *Acacia salicina.* It attacks the younger branches, causing fusiform swellings several inches in length, and in the middle two to four times the diameter of the branch. The bark bursts finally in several places, and the brown spores thickly cover the surface of the wounds. The branches, and finally the shrub, so attacked die after one to three years, or support life in a stunted form to an indefinite extent.

Black Hill, N.E. of Adelaide ; Sandy Cr., Callington. October to November, 1887.

Dimerosporium Ludwigianum, *Sacc., sp. n.* On *Lagenophora Billardieri*, forming raised pustules on the leaves; spores ferruginous. Common in open woody hill districts.

Clarendon, Angaston, &c., November, 1887.

Capnodium elongatum, *B. & D.* It is distributed over the leaves of some species of Acacia.

Williamstown, October, 1888.

Chætomium comatum *(Tode), Fr.* A black rust upon straw, Norwood, 1888.

Septoria Bromi, *Sacc.* On the leaves of *Kœleria phleoides* (an introduced grass).

Murray Bridge, November 1887.

Heterobotrys paradoxa, *Sacc., gen.* and *sp. n.* Dr. Ludwig states that it was found on all specimens of *Bertya rotundifolia*, a Kangaroo Island plant.

The following remarks are taken from letters and publications by Dr. Ludwig, in the "Bot. Central Blatt," No. 11, 1888 :—"The leaves of this small shrub are rough, of a dull dark green, and densely covered by minute hairlets of a peculiar structure. The

stalk or erect portion is from 300 to 350 u in length, and 30 to 50 u thick, and from its apex radiates a whorl of ten to twenty bristly, one-celled branches, of about the same length, but in average only three to five u thick (excepting the much stouter base), which are placed at right angles to the stalk." "In the stalk of these stellar hairs appears to be the principal seat of the fungus, for it is frequently so much invaded by it that very little of the original contents remains. Arriving at the summit the fungal threads grow spirally around the bristle-like stellar branches, frequently occupying all in the whorl, and twisting around them as closely and regularly as 'beans or hops around the poles' When developed luxuriously the threads branch and anastomose profusely, producing parcels of brown accumulated cells, which impart a still darker tint to the leaves and other parts. All that remains finally are small heaps of globular spores of five to six u diameter, adhering to some of the bristles. The spiral twist of this microscopic climber is from left to right almost unexceptionally; occasionally some of the bristles themselves are so twisted, or several together, but this may be due to the screw-like growth of the fungus." "The mycelium likewise invades the leaf structure, frequently filling the cells and destroying the epidermis, when it imparts to these parts a blackish tint, which is owing to the colour of the threads and spores. In this character it exhibits affinity to *Fumago salicina*, and probably also to *Pleospora herbraum*."

Stereum hirsutum, *Fr.*, *var. aurantium*. A pale orange-coloured woody fungus on old bark of the Sheaoak, *Casuarina quadrivalvis*.

Mount Lofty Ranges, August, 1887. A well-known species, but the locality and host are probably new.

Stereum amœnum (*Leo.*), *Sacc.*

Mount Lofty Ranges. The species appears to be new for the province.

Polystictis ornamomeus, *Sacc.* On rotten timber of Stringy-bark, *Eucalyptus obliqua*.

Mount Lofty Ranges, August, 1887. This species is new for the province.

Polystictis sanguineus (*L.*), *Fr.*

Lake Eyre, Pandappa, August 2, 1887.

Trametes hispidula, *Berk.* An orange-coloured widely looped fungus, living on the ground or very rotten timber in the sandy scrub.

Williamstown, October, 1888. Species new for South Australia.

Cyphella polycephala, *Sacc.*, *sp. nov.* On dry twigs of *Senecio hypoleucus*, a suffruticose composite plant common on the hillsides near Adelaide.

The specimen sent was taken from a shrub cultivated in my garden at Norwood, August, 1887.

Panus lateritius, *Sacc.*, *sp. nov.* Upon rotten wood of *Eucalyptus corynocalyx*, or sugar gum.

Karatta, Kangaroo Island, November, 1886.

Nummularia pusilla, *Sacc.*, *sp. nov.* It forms raised round pustules of intense black colour, and thickly studding rotten stems of *Bursaria spinosa*, which give the appearance as if the sticks were carbonised by a bush fire.

List of Australian Ustilaginæ, with Description of and Remarks about a New South Australian Species.

The Ustilaginæ, or Smuts, form an important section of fungi (Coniomycetes), inasmuch as many of them prove destructive to grasses and cereals useful or indispensable to man.

The following is a list of those known from Australia according to Dr. F. Ludwig, which is remarkable for its paucity. Of the 400 species known, 86 occur in Germany alone, hence the above-named specialist directs the attention of Australians to this section as offering a wide field of discovery. I collate Dr. Ludwig's list with Dr. Cooke's from 1880 to show the modifications and additions, distinguishing those of the latter left out from the former by enclosure in brackets, and the additions by an asterisk.

* Ustilago australis, *Cke.*, in spikelets of *Eriachne*; Trop. Australia.

" (carbo, *Tulasne*; Queensland).

" Muelleriana, *Thuemen*; in seeds of *Juncus planifolius*; V., S.A.

* " fimbristylis, *Thuemen*; in ripe seeds of *Fimbristylis*; Trop. Australia.

" marmorata, *Berkeley*; upon leaves of *Isolepis inundata*; S.A., V.

" bromivora *(Tul.) Winter*; in flowers of *Triraphis mollis*; S.A., V., N.S.W.

" segetum *(Bull., Ditm.), Winter*; in flowering spikelets of *Avena sativa*; Q.

" solida, *Berkeley*; upon *Schœnus imberbis*; V., N.S.W.

Ustilago utriculosa *(Mont., Nees), Winter ;* in the flowers of *Polygonum minus ;* V., S.A. ?

" (Emodensis, *Berkeley ;* Q.).

" (bullata, *Berkeley ;* S.A., V., N.S.W.).

" (piluliformis, *Tulasne ;* V.).

* " Tepperi, *Ludwig, sp. nov.*

Spores powder-like, black, replacing more or less completely the flowering panicle and other parts above the rootstock, form spheroidal or shortly elliptical, diameter=12-17 u ; colour, deep brown ; epispores papillose to aculeate.

Habitat.—South Australia.

This smut attacks *Amphipogon strictum, Neurachne alopecuroides* and *Danthonia penicillata*, and is at times quite common. It has been observed at Ardrossan (Yorke's Peninsula), Callington, Clarendon, and about Adelaide from about the end of September to December.

Cintractea (Ustilago) axicola, *Berkeley ;* in panicles and fruits of *Cyperus, Fimbristylis*, and *Scirpus ;* Queensland.

* Doassansia punctiformis, *Winter ;* upon leaves of *Lythrum hyssopifolium ;* S.A. ?

* Thecaphora globuligera, *Berk. & Br. ;* in the glumes of *Leersia hexandra ;* N.S.W., Q.

Sorasporium Muellerianum, *Thuemen ;* in the panicles of *Cladium filum ;* V. (S.A. ?).

" Eriachnis, *Thuemen ;* in the spikelets of *Eriachne ;* Q.

* Cerebella Paspali, *Cke. & Mass. ;* upon *Paspalum scrobiculatum ;* Trop. Australia.

ABSTRACT OF PROCEEDINGS

OF THE

Royal Society of South Australia,

FOR 1888-89.

ORDINARY MEETING, NOVEMBER 6, 1888.

Prof. RENNIE in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed some metamorphic rocks from the ranges between Williamstown and the South Para. J. J. EAST showed geological specimens from the McDonnell Ranges and adjacent parts of Central Australia.

MOTION.—J. G. O. TEPPER, F.L.S., moved, and S. DIXON seconded—"That the recommendations made by the Field Naturalists' Section with regard to the better preservation and protection of the Native Flora and Fauna of South Australia be adopted by the Society." Carried.

RECOMMENDATIONS OF THE FIELD NATURALISTS' SECTION.

That with the view of obtaining the better protection of our Native Fauna and Flora the Government should be asked—

1. To amend the Game Act, 1886 :—
   a. By extending its operation to the whole colony, including islands.
   b. By totally protecting in the State Forests all indigenous animals, save such as are found to be of an injurious character, for whose destruction licenses may be issued by the Conservator of Forests.
   c. By totally protecting, as a general rule, all harmless mammals and insectivorous birds indigenous to the colony.
2. To give due notice to the public every year, either by means of placards or otherwise, of the amount of protection afforded by law to our native animals.
3. To place diagrams, descriptive of the habits of native insectivorous birds and harmless mammals, and to give instruction with regard thereto in the public schools.
4. To vest Government Farm, Belair, and the unsold lands around Mount Crawford in trustees, consisting of representatives of science, horticulture, and labour, for the purposes of National Parks and Preserves for the indigenous Fauna and Flora.

S. DIXON moved, and W. HOWCHIN, F.G.S., seconded—"That the President (Prof. Rennie) be the representative of the Society

on a deputation to the Minister of Education with reference to the instruction of children in matters relating to the native flora and fauna." Carried.

PAPERS.—"The Occurrence of Coal Detritus in the Valley of the Murray," by W. HOWCHIN, F.G.S.

ORDINARY MEETING, DECEMBER 4, 1888.

Prof. RENNIE in the chair.

BALLOT.—John Dennant, F.G.S., was elected a Corresponding Member.

EXHIBITS.—A. ZIETZ showed a collection of native weapons from various parts of the Australian Colonies.

ANNOUNCEMENT.—Prof. TATE, F.G.S., informed the meeting that the Government of South Australia had determined to print and publish from his manuscript a "Handbook of the Flora of South Australia."

PAPERS.—"Notes on some Freshwater Cretaceous Fossils from Central Australia," by Prof. TATE, F.G.S.; "A Revision of the Flora of Kangaroo Island," by Prof. TATE, F.G.S.

ORDINARY MEETING, FEBRUARY 5, 1889.

J. S. LLOYD, Esq., in the chair.

EXHIBITS.—Rev. H. KEMPE forwarded some ants from the River Finke, which were provided with sacs filled with a sweet fluid. D. J. ADCOCK showed what was probably a coccid on a seed-capsule of a eucalypt, from Daly Waters.

PAPERS.—"Foraminifera of the Older Tertiaries of Australia; part. i., Muddy Creek," by W. HOWCHIN, F.G.S. "The Cyclostomata of South Australia," by A. ZIETZ.

ORDINARY MEETING, MARCH 4, 1889.

Prof. RENNIE in the chair.

EXHIBITS.—J. G. O. TEPPER, F.L.S., showed a collection of rare moths, including *Opsirhina*, sp. (?), from Terowie, and *Chærocampa*, sp. nov., from Silverton, and *Pinara cana*; also two new fungi, *Battarea Tepperi* (Ludwig) and *Ustilago Tepperi* (Ludwig). A. ZIETZ showed a new Snake for South Australia, *Furina Ramsayi*, from Hergott Springs.

PAPERS.—"Outcrops of Granatoid Rocks on the Murray Flats, not hitherto mapped," by W. HOWCHIN, F.G.S. "Industrial Applications of Dynamo-Electricity," by C. Umbehaun.

Ordinary Meeting, April 2, 1889.

Prof. Rennie in the chair.

Exhibits.—D. B. Adamson laid on the table some photographs of the moon. A. Zietz showed a large specimen of the deaf-adder, 32 in. long. J. G. O. Tepper, F.L.S., showed some rare fungi found in South Australia. W. Rutt, C.E., showed a specimen of petrified wood from a bed of gypsum in the reservoir at Irrappatonna, 10 miles north of the Peake Creek. Prof. Tate showed a sample of native sulphur found in an auriferous reef near Oakbank containing iron pyrites. W. T. Bednall showed a rare moth.

Paper.—"Geological Structure and Physical Features of Central Australia," by J. J. East.

Ordinary Meeting, May 7, 1889.

Prof. Rennie in the chair.

Ballot.—Joseph Vardon, J.P., was elected a Fellow.

Exhibits.—J. G. O. Tepper, F.L.S., showed specimens of *Pielus* moths.

Discussion.—On Mr. J. J. East's paper read at the April meeting, in which Mr. Howchin, F.G.S., and Mr. J. Lindsay took part.

Ordinary Meeting, June 7, 1889.

Dr. Whittell in the chair.

Ballot.—J. C. Fraser was elected a Fellow.

Exhibits.—J. G. O. Tepper, F.L.S., showed some new species of *Locustidæ*. A. Zietz showed some native implements found near Milang; also some new fishes from the overflow of the borehole at Strangways Springs.

Paper.—"On some South Australian *Polyzoa*," by P. H. McGillivray, M.R.C.S., F.L.S., &c.

Ordinary Meeting, July 2, 1889.

Prof. Rennie in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., showed large seeds from Beltana, which might belong to a species of *Cycas*; also a hard species of fungus allied to the *Polypodiæ*, and a liverwort, *Marchantia cephalocypha* (Ludwig); also a small moth from Beltana, probably new, and a large brown-coloured one with bristles, genus and species unknown. A. Zietz showed a collection of South Australian *Polyzoa*. Prof. Tate showed specimens

of *Campotropus inflatus*, from Hermansburg, Central Australia, sent by the Rev. H. Kempe.

Papers.—"Plant-Bearing Strata in Central Australia," by Prof. Tate, F.G.S. "Notes on some Rumbling Sounds heard at Gill's Bluff," by F. D. Johnson. July 9, 1888, 10.30 p.m.—Rumbling sound like blowing off of steam from a large boiler, lasting about forty seconds. July 22, 7 p.m.—Heard a similar noise. July 30, 10.50 p.m.—Rolling sound from the same quarter as on the previous occasions; lasted about 30 seconds. October 22, 10.30 p.m.—Rolling kind of noise for a few seconds. November 21, 8 p.m.—Slight rumbling sound. This was heard also by Mr. Rose, a prospector, who got up and questioned some natives camped alongside, who replied, "That one, along a ground." February 14, 1889, 10.40 p.m.—Loud rumbling sound, heard by the men in the camp. April 24, 1889, 6.30 p.m.—Low rumbling sound for half a minute. The evenings were invariably calm and clear, and gave no indications of any atmospheric disturbance.

Ordinary Meeting, August 6, 1889.

Prof. Rennie in the chair.

Ballot.—P. H. McGillivray was elected a Corresponding Member.

Communication.—Prof. Rennie read a notice giving particulars of the next meeting of the Australasian Association for the Advancement of Science in Melbourne, January 7, 1890.

Exhibits.—A. Zietz showed a living specimen of *Dromicia concinna*; also a new fish *(Cyttus australis)*; also a rare night lizard *(Nephrurus platyurus)*. J. G. O. Tepper, F.L.S., showed some locusts from Warrina, sent by Dr. Kennedy.

Papers.—"Notes on *Heterobotrys paradoxa*, found on *Bertya rotundifolia*," by Dr. F. Ludwig; also by the same, "Notes on some new Australian Ustilaginæ." Both papers on specimens forwarded by J. G. O. Tepper, F.L.S., who communicated the papers. "Additions to the Australian Characeæ," by Baron v. Mueller, K.C.M.G.

Ordinary Meeting, September 10, 1889.

Prof. Tate in the chair.

Exhibits.—J. G. O. Tepper, F.L.S., a collection of plants from Roebuck Bay, Western Australia. J. J. East showed some geological specimens collected by W. T. Tietkins, F.R.G.S., in Central Australia.

Motion.—J. G. O. Tepper, F.L.S., moved, and S. Dixon seconded—"That this Society acquiesces in and supports the

action of the Field Naturalists' Section respecting the permanent dedication of large tracts of land for the conservation of the native flora and fauna, and also general forest culture upon scientific, hygienic, and economic principles." Carried.

Papers.—"Notes on a Pentateuchal Roll," by F. W. Pennefather, LL.B., &c. "Notes on certain Pores on the Wings of some Dipterous Insects," by Frazer S. Crawford.

Dr. Stirling announced that he would shortly submit a full diagnosis of the newly-discovered mammal, referred to in last year's volume of the Transactions, to which he gives the name of *Psammoryctes typhlops*, gen. et spec. nov.

Annual Meeting, October 1, 1889.

Prof. Rennie in the chair.

Auditor.—D. J. Adcock was proposed and elected to audit the accounts for the past season.

The annual report and balance-sheet were read, adopted, and ordered to be printed.

The annual reports and balance-sheets of the Field Naturalists' and Microscopical Sections were read and accepted.

Election of Council.—The nomination and election of officers for the ensuing year was as follows:—President, E. C. Stirling, M.D.; Vice-Presidents, H. T. Whittell, M.D., and Rev. Thos. Blackburn, B.A.; Hon. Treasurer, W. Rutt, C.E.; Hon. Secretary, W. L. Cleland, M.B.; Members of Council, Prof. Tate, F.G.S., Professor Rennie, D.Sc., D. B. Adamson, Samuel Dixon, W. Howchin, F.G.S., W. B. Poole.

President's Address.—Prof. Rennie, D.Sc., gave an address "On some Recent Advances in Chemical Classification."

Papers.—"Additions to South Australian Coleoptera, by Rev. Thomas Blackburn, B.A. "Systematic Census of South Australian Plants," by Prof. Tate, F.G.S. "Gums and Resins of Australian Proteaceæ," by J. H. Maiden, F.L.S. "New Species of South Australian Plants," by Prof. Tate, F.G.S.

ANNUAL REPORT.

The Council has the pleasure of reporting that the work of the Society has been carried on successfully during the past year. The following papers have been laid before the Society:—"Notes on some Freshwater Cretaceous Fossils from Central Australia (Lake Eyre)," by Prof. Tate, F.G.S.; "A revision of the Flora of Kangaroo Island," by Prof. Tate, F.G.S.; "Foraminifera of the Older Tertiaries of Australia, Part I., Muddy Creek, Victoria," by W. Howchin, F.G.S.; "The Cyclostomata of South Australia," by A. Zietz; "On some Outcrops of Granitoid Rocks on the Murray Flats, not hitherto mapped," by W. Howchin, F.G.S.; "Industrial Applications of Dynamo-Electricity," by C. Umbehaun; "Geological Structure and Physical Features of Central Australia," by J. J. East; "On some South Australian Polyzoa," by P. H. McGillivray, M.R.C.S., F.L.S.; "Plant-bearing Strata in Central Australia," by Prof. Tate, F.G.S.; "List of Australian Ustilaginæ, with description of a new species," by J. G. O. Tepper, F.L.S.; "Additions to Australian Characeæ," by Baron v. Mueller; "Fragment of a Pentateuchal Roll," by Mr. Pennefather, LL.B.; "Notes on Certain Pores upon the Wings of Dipterous Insects," by F. S. Crawford; "Gums and Resins of Australian Proteaceæ," by J. H. Maiden, F.L.S.; "Notes on *Heterobotrys paradoxa*," by J. G. O. Tepper, F.L.S.; "New Australian Coleoptera," by Thos. Blackburn, B.A.; "Definitions of four New Species of Plants," by Prof. Tate, F.G.S.; "Revised Census of South Australian Plants," by Prof. Tate, F.G.S.

During the year there have been presented to the notice of the Fellows and members many new and interesting exhibits of natural history, chiefly through the instrumentality of Mr. J. G. O. Tepper, F.L.S., and A. Zietz, both of the Adelaide Museum.

His Excellency the Earl of Kintore has consented to be Vice-Patron.

The membership of the Society consists of 94 Fellows, eleven Hon. Fellows, seventeen Corresponding Members, and two Associates. During the year two new Fellows have been elected, and two new Corresponding Members, namely, John Dennant, F.G.S. (Victoria), and P. H. McGillivray, M.R.C.S. (Victoria). No Fellow or member has died during the year, but there have been several resignations from varying causes.

The reports of the two Sections of the Sooiety, namely, the

Field Naturalists' and Microscopical Sections, show continued vitality, and that they are self-supporting. The report of the Sub-Committee of the Field Naturalists' Section on the Preservation of the Native Flora and Fauna is of especial interest and importance, and the efforts being made in this direction should have the hearty co-operation, not only of the members of the Society, but of all lovers and students of Nature. It is to be regretted that so much ignorant apathy has yet to be overcome, but persistence in the end cannot fail to vanquish even that obstacle.

During the year the Library of the Society has continued to be enriched by numerous periodical exchanges and valuable monographs, a list of which appears elsewhere. Some new European exchanges have been authorised during the past year.

It is with great satisfaction that the Council is able to announce that within a few days Prof. Tate's "Handbook on the South Australian Flora" will be published. This is a want that has been long needed; and the appearance of such a work will give a great stimulus to botanical study. It will enable those who hitherto have had to be content with playing the rôle of simple collectors to become botanists; and as a consequence they will become still better collectors, because of their increased scientific knowledge. Even to the fortunate possessors of Bentham's "Flora Australiensis," the new work will be welcome, as it contains descriptions of numerous plants that have been discovered since the publication of that great opus. Prof. Tate's extensive experience as a teacher and a scientific botanist have enabled him to combine qualities not often united, and the valuable effect of these are to be seen in the descriptions of the diagnostic characters of plants.

THE TREASURER IN ACCOUNT WITH THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Dr.	£ s. d.	£ s. d.	Cr.	£ s. d.	£ s. d.
October 1, 1888.			By Cost of Transactions—		
To Balance		256 18 7	Printing and Binding	95 10 10	
" Subscriptions—Royal Society ..	89 15 6		Illustrating	50 8 0	
Field Naturalists' Section	23 0 0		Editing and Publishing ..	4 1 0	
Microscopical Section ..	7 5 0				149 19 10
		120 0 6	" Salary of Assistant Secretary ..		21 0 0
" Government Grant		136 13 0	" Advertising		4 14 6
" Interest		8 11 2	" Printing, Postage, Stamp Tax, and Stationery		13 17 8
" Sale of Transactions		1 2 6	" Grant to Field Naturalists' Section ..		25 0 0
			" " Microscopical Section ..		7 5 0
			" Library - Binding		7 9 0
			" Balance—Bank of South Australia ..	58 4 2	
			Savings Bank	234 14 8	
			In Hon. Secretary's hands ..	1 0 0	
			In Treasurer's hands ..	0 0 5	
					293 19 3
		£523 5 9			£523 5 9

Audited and found correct,

D. J. ADCOCK, Auditor.

October 1st, 1889.

WALTER RUTT, Hon. Treasurer.

30th September, 1889.

DONATIONS TO THE LIBRARY

For the Year 1888-9.

I.—Transactions, Journals, and Reports.

Presented by the respective Societies, Editors, and Governments.

Baltimore—American Chemical Journal; vol. IX., Nos. 4 to 6; vol. X., Nos. 1 to 6.

——— Johns-Hopkins' University Studies; fifth series, Nos. 8 to 12; seventh series, No. 1.

——— Johns-Hopkins' University Circulars; Nos. 58 to 63, and 65 to 67.

Batavia — Naturrkundig-Tijdschrift voor Nederlandsch-Indie; Achtste Serie, Deel IX.

Belfast (Ireland)—Report and Proceedings of the Belfast Natural History and Philosophical Society for 1887-8.

Belgium—Annales de la Société Belgique; tomes 16 to 22.

Berlin—Sitzungsberichte der Königlich Preussischen Akademie der Wissenschaften zu Berlin; 1888; Nos. 21 to 52.

——— Königlich Preussischen Meteorologischen Institut—Instruktion für die Beobachter an den Meteorologischen Stationen II., III., und IV. Ordnung.

——— Ergebnisse der Meteorologischen Beobachtungen im Jahre, 1887.

Bonn—Verhandlungen des Naturhistorischen Vereines der Preussischen Rheinlande, Westfalens und des Reg.-Bezirks, Osnabrück; part 2, 1886; 1887-8; part 1, 1889.

Boston—Memoirs of the Boston Society of Natural History; vol. IV., Nos. 1 to 6.

——— Proceedings of the American Academy of Sciences; part 1, vol. XXII.; part 2, vol. XXIII.

——— Proceedings of the Boston Society of Natural Sciences; vol. XXIII., parts 3 and 4.

Buenos Ayres—Boletin de la Academia Nacional de Ciencias en Cordoba (Republica Argentina); vol. XI., 1888.

California—Bulletin of the Californian Academy of Sciences (San Francisco); vol. II., No. 8.

California—Memoirs of the Californian Academy of Sciences; vol. II., No. 1.

Cambridge (U.S.A.)—Bulletins of the Museum of Comparative Zoology at Harvard College; vol. XIV.; vol. XV.; vol. XVI., Nos. 2 to 5; vol. XVII., Nos. 2 and 3.

Canada—The Canadian Record of Science; vol. III., Nos. 3 to 6 (Montreal).

——— Catalogue of Canadian Plants; part 5.

Cape Town—Transactions of the South African Philosophical Society; vols. I., II.; vol. IV.; vol. V., part 1; 1877-88.

Chili—Verhandlungen des Deutschen Wissenschaften Vereins zu Santiago, 1888.

Connecticut (America)—Transactions of the Meriden Scientific Association; vol. II., 1885-6; vol. III.

Costa-Rica—Anales dei Museo Nacional (San José); vol. I., 1887.

Edinburgh—Proceedings of the Royal Society of Edinburgh, for the years 1883-7.

———— Proceedings of the Royal Physical Society, 1887-8.

Geneva—Compte Rendu des Séances de la Société de Physique et d'Histoire Naturelle de Genève; V., 1889.

Gottingen—Nachrichten von der Königlich Gesellschaft der Wissenschaften und der Georg-Augustus-Universitat zu Göttingen; 1887, Nos. 1 to 21; 1888, Nos. 1 to 17.

Halle—Leopoldina, Amptliches Organ der Kaiserlich Leopoldino-Carolineschen Deutchen Akademie der Naturforscher; hefte 22 and 23 (1886 and 1887).

Japan—Calendar of the University of Japan (Tokio), for 1888-9.

——— Journal of the College of Science, Imperial University (Tokio); vol. II., parts 4, 5; vol. III., parts 1 and 2.

Lausanne—Bulletin de la Société Vaudoise des Sciences Naturelles; series 3, Nos. 98, 99.

London—Journal of the Royal Microscopical Society, 1888; parts 5, 6, 6a; 1889, parts 1, 2, 3.

———— Proceedings of the Royal Society; vol. XLII., Nos. 256 to 270.

———— List of Fellows, &c., of the Royal Society.

———— The Eruption of Krakatoa and Subsequent Phenomena (Royal Society).

———— Medical Press and Circular; May, 1889.

Massachussetts—Bulletins of the Essex Institute; vol. XIX., Nos. 1 to 12.

Mexico—Anuario del Observatorio Astronomico Nacional de Tacubaya; 1889, vol. IX.

New South Wales—By Committee of Management, Technological Museum of N.S. Wales—The useful Native Plants of Australia (including Tasmania). By J. H. Maiden, F.L.S., &c.

——— Results of Meteorological Observations made in New South Wales in 1886. By H. C. Russell, B.A.

——— Rain, River, and Evaporation Observations made in New South Wales during 1887. By H. C. Russell, B.A., &c.

——— Proceedings of the Linnean Society of New South Wales; second series; vol. III., parts 3, 4; vol. IV., parts 1, 2.

——— List of Errata in the Catalogue of the Australia Scyphomedusæ and Hydromedusæ. By R. von Lendenfeld, Ph. Dr., &c.

——— Tabular List of all the Australian Birds known to the Author. By E. P. Ramsay, Curator of the Australian Museum.

——— Minerals of New South Wales. By A. Leversidge, F.R.S.

——— Journal and Proceedings of the Royal Society of New South Wales; vol. XXII., part 2.

——— Australian Museum, Sydney: Memoir. No. 2.

——— Sydney Free Public Library: Report for 1888-9.

——— Calendar of the University of Sydney for 1889.

——— Australian Museum: Report of Trustees for 1888.

——— The Source of the Underground Water in the Western Districts. By H. C. Russell, B.A., F.R.A.S., &c.

——— Results of Rain, River, and Evaporation Observations in New South Wales. By H. C. Russell, B.A., F.R.A.S., &c.

New York, U.S.A.—Transactions of the New York Academy of Sciences; vols. VI., VII., Nos. 1 to 8; vol. IV.

——— Annals of the New York Academy of Sciences, late Lyceum of Natural History; vol. IV., Nos. 3 to 6.

——— The Comparative Danger to Life of the Alternating and Continuous Electrical Currents. By Harold P. Brown.

New Zealand—Report of the Auckland Institute and Museum for 1888-89.

———— Transactions and Proceedings of the New Zealand Institute, 1888; vol. XXI.

———— Reports of Geological Explorations during 1887-8; No. 19; Colonial Museum and Geological Survey of New Zealand.

———— Twenty-third Annual Report on the Colonial Museum and Laboratory.

———— Meteorological Report for 1885.

Norway—Bergens Museums Aarsberetning for 1887.

Ohio, U.S.A.—The Bulletins of the Scientific Laboratories of Denison University; vols. I., II., and IV.

———— Memoirs of the Denison Scientific Association (Granville); vol. I., No. 1.

Paris—Societé Entomologique de France; Bulletins for April and May, 1889.

Philadelphia—Proceedings of the Academy of Natural Sciences of Philadelphia; 1887, part 3; 1888, parts 1, 2, 3.

Queensland—Proceedings of the Royal Society of Queensland; vol. III., parts 4, 5; vol. V., part 5. vol. VI., 1 and 2; and Annual Report, July, 1889.

Rio de Janiero—Revista do Observatorio. Publicacão mensal do Imperial Observatorio do Rio de Janiēro; Anno IV., Nos. 1 to 6.

South Australia—Annual Progress Report of the State Forest Administration in South Australia for the year 1887-8.

————————Report of the Board of Governors of the Public Library, Art Gallery, and Museum for 1887-8.

————————Meteorological Observations taken at the Adelaide Observatory, May, June, July, 1888; Sept., Nov.-Jan.

————————Report on a Journey from Adelaide to Hale River, by H. Y. L. Brown, Govt. Geologist.

————————Report upon the Progress and Condition of the Botanic Garden for 1888.

St. Louis—The Transactions of the Academy of Science of St. Louis; vol. IV., Nos. 1 and 2.

Tasmania—Papers ordered by the Legislature to be printed.

Trenton (U.S.A.)—Journal of the Trenton Natural History Society; No. 3 (1888).

Turin—Bollettino dei Musei di Zoologia ed Anatomia Comparata

della R. Universita di Torino; vol. III., parts 49 to 66.

Victoria—The Victorian Naturalist; vol. V., Nos. 7 to 12; vol. VI., Nos. 1 to 5.

——— Transactions of the Geological Society of Victoria; vol. I., parts 1 and 2.

——— Prodromus of the Palæontology of Victoria. By Frederick McCoy, F.G.S., &c. Decades VI. and VII.

——— Prodromus of the Zoology of Victoria. By Fredk. McCoy, C.M.G., &c. Decade XVII.

——— Victorian Year-Book for 1887-8; vols. I. to III.

——— Victorian Engineer; vol. III., Nos. 5 to 9.

——— Transactions of the Royal Society of Victoria; vol. I., part 1. Proceedings (new series); vol. I.

——— Iconography of the Australian Species of Acacia and Cognate Genera. Baron F. von Mueller. Decade XIII.

——— Key to the System of Victorian Plants. By F. von Mueller; vols. I. and II.

——— Select Extra-Tropical Plants, &c. Seventh edition. By F. von. Mueller.

——— Systematic Census of Australian Plants. Fourth supplement. Baron F. von Mueller.

——— Results of Astronomical Observations made at the Melbourne University in 1881-2-3-4. By R. L. J. Ellery, F.R.S., F.R.A.S.

——— Catalogue of Oil Paintings, &c., in the National Gallery of Victoria.

Vienna—Verhandlungen der K. K. Geologischen Reichenstalt, 1887, Nos. 1 to 16; 1888, Nos. 12 to 14; 1889, Nos. 1 to 9.

———Kaiserliche Akademie der Wissenschaften in Wien. Sitzung der Mathematisch-Naturwissenschaftliche Classe, 1888, Nos. 16 to 18, and 20 to 24; 1889, Nos. 1 to 3.

———Verhandlungen der K. K. Zoologisch-botanischen Gesellschaft in Wien; vols. 37 and 38.

Washington (U.S.A.)—Publications by the Smithsonian Institute:—

———————Annual Report of the Board of Regents of the Smithsonian Institution to July, 1885, part 2.

———————Compilation of Notes and Memoranda bearing upon the Use of Human Ordure and Human Urine in Rites

of a Religious or Semi-Religious Character among Various Nations.

Washington (U.S.A.)—Bibliography of the Siouian Language. By J. C. Pilling.

————————Bibliography of the Eskimo Language. By J. C. Pilling.

————————The Use of Gold and other Metals among the Ancient Inhabitants of Chiriqui, Isthmus of Panama. By Wm. H. Holmes.

————————Work of Mound Exploration of the Bureau of Ethnology. By Cyms Thomas.

————————Perforated Stones from California. By Hy. W. Henshaw.

By U.S. Geological Survey:—

————————Mineral Resources of the United States. By David T. Day.

————————Monographs—XII.—Geology and Mining Industry of Leadville, with Atlas.

————————Bulletins, Nos. 40 to 47.

————————Mineral Resources of the United States, year 1887.

LIST OF FELLOWS, MEMBERS, &c.

NOVEMBER, 1889.

Those marked (F) were present at the first meeting when the Society was founded. Those marked (L) are Life Fellows Those marked with an asterisk have contributed papers published in the Society's Transactions.

HONORARY FELLOWS.

		Date of Election
Barkely, Sir Henry, K.C.M.G., K.C.B.	... ...	1857
Ellery, R. L. J., F.R.S.	Melbourne	1876
Garran, A., L.L.D.	Sydney	1853
Hull, H. M.	Hobart	1855
Jervois, Sir W. F. D., K.C.M.G., C.B.	New Zealand	1878
Little, E.	... ...	1858
Macleay, Sir W., F.L.S.	Sydney	1878
*Mueller, Baron F. von, K.C.M.G., F.R.S.	Melbourne	1879
Russell, H. C., B.A., F.R.A.S. ...	Sydney	1876

CORRESPONDING MEMBERS.

Bailey, F. M., F.L.S.	Brisbane	1881
Canham, J.	Stuart's Creek... ...	1880
*Cloud, T. C., F.C.S.	Wallaroo	1881
*Dennant, J., F.G.S.	Melbourne	1888
*East, J. J.	Prospect	1884
*Foelsche, Paul	Palmerston	1882
Goldstein, J. R. Y.	Melbourne	1888
*Hayter, H. H., M.A., C.M.G., F.S,S.	Melbourne	1878
Holtze, Maurice	Palmerston	1882
*Kempe, Rev. J.	Finke	1880
*McGillivray, P. H., M.R.C.S., F.L.S.	Sandhurst	1889
*Maskell, W. M., ...	New Zealand	1888
Nicolay, Rev. C. G.	Fremantle, W.A. ...	1886
*Richards, Mrs. A.	Beltana	1880
*Stirling, James, F.L.S., F.G.S. ...	Melbourne	1883

FELLOWS.

*Adamson, D. B.	Adelaide	1867
Adcock, D. J.	Adelaide	1887
Angas, J. H.	Angaston	1874
Angove, W. T., M.R.C.S. ...	Tea Tree Gully ...	1888
Bagot, John	Adelaide	1887
*Blackburn, Rev. Thomas, M.A. ...	Woodville	1887
Boettger, Otto	Adelaide	1884
Bragg, Prof., M.A.	Adelaide	1886
Brown, J. E., F.L.S.	Adelaide	1881
Brown, L. G.	Two Wells	1882
*Brown, H. Y. L., F.G.S.	Adelaide	1883
Bussell, J. W....	Adelaide	1884

Campbell, Honorable Allan, M.L.C., L.R.C.P., Edin.	Adelaide	1882
Chapman, R. W., B.Sc	Adelaide	1888
*Cleland, W. L., M.B., Ch M., F.R.M.S.	Parkside	1879
(L) Cooke, E.	Adelaide	1876
Cox, W. C.	Semaphore	1880
*Crawford, F. S.	Adelaide	1865
Davis, F. W.	Adelaide	1882
*Dixon, Samuel	Adelaide	1887
Dobbie, A. W.	Adelaide	1876
Elder, Sir Thomas	Adelaide	1871
Eyres, Thomas...	Adelaide	1887
Fleming David...	North Adelaide ...	1886
Fletcher, Rev. W. R., M.A. ...	Kent Town	1876
Foote, H.	Outalpa	1883
Fowler, W.	Kulpara	1882
Fraser, J. C.	Adelaide	1889
Gardner, Wm, M.D., C.M. ...	Adelaide	1882
Gill, H. P.	Adelaide	1883
Gill, Thomas, ...	Adelaide	1885
*Goyder, Geo., jun.	Adelaide	1880
Grasby, W. C	Adelaide	1887
Grundy, E. B.	Adelaide	1882
Harris, C. H.	Adelaide	1883
Harrold, A. L.	Adelaide	1876
Hay, Hon. A, M L.C.	Adelaide	1861
Henry, A., M.D.	Adelaide	1882
*Howchin, W., F.G S.	Goodwood East ...	1883
Hughes, H. W.	Booyoolie	1883
(F) Kay, R.	Adelaide	1853
Knevett, S.	Adelaide	1878
*Lamb, Prof., M.A., F.R.S. ...	England	1883
Laughton, E.	Adelaide	1874
Lendon, A. A., M.D.	Adelaide	1884
Lloyd, J. S.	Adelaide	1856
Lower, O. B.	Parkside	1888
*Lucas, R. B.	Adelaide	1885
Magarey, A. T.	North Adelaide ...	1873
*Magarey, Hon. S. J., M.B. ...	Adelaide	1874
Mayo, Geo., F.R.C S.	Adelaide	1853
Mayo, G. G.	Adelaide	1874
Mestayer, R. L., F.R.M.S. ...	Sydney	1883
*Meyrick, E. T., B.A.	England	1881
Middleton, W. J. E.	Upper Sturt	1882
Mitchell, J. T., M.D.	Port Adelaide... ...	1885
Molineux, A.	Kent Town	1880
(L) Murray, Hon. David, M.L.C. ...	Adelaide	1859
Munton, H. S....	Adelaide	1884
*Parker, Thos.	... ...	1883
Phillips, W. H.	Adelaide	1883
Phillipson, W. T.	Adelaide	1887
Poole, W. B.	Adelaide	1886
Robertson, R., F.F.P.S.	Adelaide	1882
*Rennie, Prof. E. H., D.Sc., F.C.S. ...	Adelaide	1885
Renner, F. E., M.D.	Carrieton	1885
Robins, A. F.	Adelaide	1887
Russell, William	Port Adelaide... ...	1879

*Rutt, Walter, C.E.	Adelaide	1866
Salom, Hon. M., M.L.C.	Adelaide	1866
*Schomburgk, R., Ph.D.	Adelaide	1865
Scott, Jas. L.	Hyde Park	1865
Smeaton, Thos. D.	Mount Barker... ...	1857
Smith, R Barr	Adelaide	1871
Smythe, J. T., B.A., B.E.... ...	Glenelg	1882
*Stirling, E. C., M.D., F.R.C.S. ...	Adelaide	1884
Stuckey, J. J , M.A.	Adelaide	1878
*Tate, Prof R., F.G.S , F.L.S. ...	Adelaide	1876
Thomas, J. D., M.D , F.R.C.S. ...	Adelaide	1877
*Tepper, J. G. O., F.L S.	Norwoood	1878
*Todd, Charles, C.M.G , M.A., F.R.S.	Adelaide	1856
Tyas, J. W.	Adelaide	1882
Umbehaun, C....	Adelaide	1879
Vardon, Joseph	Adelaide	1889
Varley, A. K.	Mount Gambier ...	1883
*Verco, J. C., M.D., F.R.C.S. ...	Adelaide	1878
Vickery, G.	Meadows	1868
Wainwright, Ed. H., B.Sc. ...	St. Peters	1883
Ware, W. L.	Adelaide	1878
Way, E. W., M.B.	Adelaide	1879
Way, S. J., Chief Justice	Adelaide	1859
Wheeler, F.	Freemantle, W. A. ...	1884
*Whittell, H., M.D., F.R.M.S. ...	Adelaide	1882
Wilson, John, F.E.T.S.	Goodwood	1887
*Wragge, C. L., F.R.G S.	Brisbane	1887
*Zietz, A.	Adelaide	1886

ASSOCIATES.

Hodgson, Mrs....	Port Victor	1884

APPENDIX.

FIELD NATURALISTS' SECTION

OF THE

Royal Society of South Australia.

SIXTH ANNUAL REPORT OF THE COMMITTEE, BEING FOR THE YEAR ENDING SEPTEMBER 30TH, 1889.

The Committee have pleasure in presenting the following abstract of the work of the Section for the past year :—

Excursions.—During the year eleven excursions have been held, at most of which the attendance has been very satisfactory. Some fresh localities have been visited, but no excursion occupying more than one day has been made, as was the case in the previous year. As a change from visits to the hills, which are mostly devoted to the study of botany, there have been a trawling trip, an excursion to the beach at Marino for the collection of shells, &c., and a visit to the Dry Creek Smelting Works.

Evening Meetings.—There have been seven evening meetings during the year. The attendance at these has varied considerably, but on the whole shows an improvement on that of last year. The papers have embraced a wide range of subjects, and have been contributed by the following gentlemen, viz., Professor Tate, F.G.S., Messrs. J. G. O. Tepper, F.L.S., W. B. Poole, D. D. Rosewarne, J. J. East, M. S. Clark, and W. Howchin, F.G.S. The exhibits at these meetings form an important feature, and it is pleasing to notice that they are increasing in number and in interest.

Show of Native Plants, &c.—This was held in the Town Hall in October of last year, and for a first attempt was a considerable

success. It may be stated that this was not intended (as some may have thought) to be chiefly a show of living wild flowers, there being obvious objections to such an exhibition. The principal feature of the show was the Herbaria, while a fine collection of Algæ and of floral paintings added to its variety and attractiveness. In conjunction with this exhibition the Boys' Field Club had a very creditable display of a similar character.

Protection of our Native Fauna and Flora.—The Standing Committee appointed for this purpose have devoted much time and attention to the subject. From a special report of the Committee which will be presented particulars will be gathered as to the progress made in this direction.

Local Correspondents.—Steps have been taken with a view to secure the assistance of correspondents in various parts of the colony, who, it is thought, will in many ways be of service to the Section. It is hoped that these persons will take an interest in the Natural History of the neighbourhood in which they reside, and that their aid will be secured in the preservation of native plants and animals, as well as in furnishing information as to poisonous plants, introduced weeds, native fodder plants, &c.

"*Proceedings.*"—Arrangements have been made whereby the "Proceedings" of the Section for the current year will be printed more fully than before, besides being issued at a moderate cost and at a much earlier date than usual.

Membership.—Eighteen new members have been added to the roll during the year, and twenty names have been removed. Of the latter, seven have left the colony and seven have resigned, the balance being struck off for various reasons. The number now on the roll is 112.

Walter Howchin, Chairman.
W. H. Selway, Jun., Hon. Sec.

Adelaide, 17th September, 1889.

Annual Progress Report

Presented by the Native Fauna and Flora Protection Committee at the meeting of the Field Naturalists' Section of the Royal Society held on September 17, 1889.

The Committee appointed at the last annual meeting of the Section to endeavour to secure better protection for the native fauna and flora, desire to present the following progress report :—

National Parks.—As the result of a deputation which waited

on the Premier of the day in October, 1888, together with considerable subsequent correspondence and other action, a promise has been obtained from the Government to the effect that reserves of this character will be made, although the size and other details have not yet been settled.

The Game Laws.—Through the aid of Mr. R. G. Solomon, of Newark, United States, and of local skin merchants, the Government was induced to introduce an amending Game Bill, providing for the partial protection of kangaroos and opossums. The measure, however, met with strong opposition in the Legislative Council, and was rejected by that House on the second reading, without a division being taken. The arguments used by the adverse speakers were apparently based upon the state of affairs existing three years ago and not upon the facts as they now are. The only hope of the absolute extinction of the kangaroo being prevented seems to lie in the fact that before long its numbers will have become so small as to render its chase for the purposes of commerce unremunerative. The Bill was by no means of the comprehensive character desired by the Section, but no further legislation in this direction can be attempted till next session. In accordance with the request of the Committee, placards notifying the chief provisions of the Game Act have been circulated throughout the districts affected by its enactments by order of the Commissioner of Crown Lands, who has given instructions to the police to secure, as far as possible, the observance of the statute. The corresponding members of the Section have also promised to help in this work.

Education in Natural History.—The Committee requested the Education Department to give more direct instruction in natural science, especially in its relations to the native fauna and flora, and although not much has yet been done towards this end, there is reason to believe that the next few years will see a considerable advance in the direction indicated. The extension of the operations of the Boys' Field Club to the country towns of the colony will also largely tend to promote that healthier public sentiment which is so desirable in the interests of the movement.

Forest Reserves.—Determined efforts have been made during the year by a certain section of the community to obtain the extensive resumption of forest and other reserves for the purposes of cultivation. The Committee had a motion tabled at a meeting of the Section protesting against any such action being taken, and the resolution was forwarded to the Commissioner of Crown Lands. It is with much pleasure that the Committee have noticed that a motion was subsequently passed in the Upper House affirming the undesirableness of resuming the forest reserves.

Information as to the best methods of securing the objects of the Committee is now being sought by the Committee from similar organizations in various parts of the world, and every feasible means will be used to attain the desired end. The movement has received the approval of the Royal Society and the support of the Geographical Society, the Microscopical Section, and of many other organizations. The subject will be discussed at the next meetings of the Australasian Association for the Advancement of Science, and vigorous efforts have been made by the Committee to excite a healthy interest in the matter in the different colonies.

In conclusion the Committee, although regretting that they can show but few distinctly tangible results, yet hope that the movement will eventually prove in a considerable measure successful, and they trust that they will have the cordial assistance of all with any love for the plants and animals of their country.

SAMUEL DIXON, Chairman.
A. F. ROBIN, Hon. Sec.

September 17, 1889.

FIELD NATURALISTS' SECTION OF THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

Receipts and Expenditure for the Year ending 30th September, 1889.

Dr. Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance brought forward	2	12	6				
" Grant from Royal Society	25	0	0	By Printing	9	5	6
" Amount received from Subscriptions	23	0	0	" Postages	7	18	0
				" Advertising	3	0	8
				" Attendance (caretaker)	1	5	0
				" Bugle	1	15	0
				" Sundries	1	3	2
					£24	7	4
				" Subscriptions handed over to Hon. Sec. Royal Society	23	0	0
					£47	7	4
				" Balance in hand	3	5	2
	£50	12	6		£50	12	6

Audited and found correct,

J. H. C. LANGDON, } Auditors.
THOS. EVANS, }

Adelaide, 16th September, 1889.

W. H. SELWAY, Jun., Hon. Sec.

MICROSCOPICAL SECTION

OF THE

Royal Society of South Australia.

ANNUAL REPORT FOR 1888-9.

We are glad to be able to report that during the year increasing interest has been manifested in the work of the Section. The attendance at the meetings has been much better than in the past, and the members who were present appear to have profited by the various subjects brought under discussion. The plan adopted this session of devoting a short time of each evening to practical demonstration on some elementary branch of microscopical manipulation seems to have had a beneficial effect, and it is to be hoped that, if possible, this plan will be continued.

The excursions made in search of objects have been a source of great pleasure, and many places near Adelaide have been found which afford a valuable field for microscopical research, being rich in organisms—some no doubt new to science.

The Section has been fortunate during the year in receiving two large donations of books. Mr. C. C. Farr, on leaving for England, presented us with a large number of microscopical magazines; and Mr. H. C. Mais has again shown his interest in us by making us a further donation of all his large collection of bound works on the microscope, in all twenty-nine volumes. We have now, for a young Society, a very complete and valuable reference library.

The present number of members is thirty-three. Several have resigned during the year, and six new members have been elected. The average attendance at the meetings has been eleven, exclusive of visitors.

The subjects discussed at the meetings were as follows:—

1888.

Oct. 9. Pollen in its relation to hay fever, by F. S. Crawford.
Nov. 13. Forms of Life found by Dredging, by Mr. Baker.

1889.

Mar. 12 Cleaning lenses, slips, and cover-glasses, by Mr. F. S. Crawford. Structure of the Floscularia, by Mr. Poole.

Apr. 9. Demonstration on cell-making, by Mr. Poole. Paper on a Hydroid Zoophyte, Cordylophora lacustris, by Mr. Baker.

May 14. Paper on Illumination by Condensers, by Dr. Whittell

June 11. Demonstration on mounting wool and fur, by Mr. Poole. Illumination by the Abbe-Condenser, by Dr. Whittell.

July 9. Paper on Pond life, by Mr. J. W. Bussell.

Aug. 13. South Australian Polyzoa, by Mr. Zietz.

Sept. 3. Demonstration on use of Camera-lucida, by Mr. F. S. Crawford.

Excursions have been made to the following places:—

April 6. Hope Valley Reservoir.

May 1. Botanic Gardens.

July 6. Blackwood.

Aug. 10. North Arm.

Signed, F. S. Crawford, Chairman.
J. W. Bussell, Hon. Secretary.

MICROSCOPICAL SECTION OF ROYAL SOCIETY OF SOUTH AUSTRALIA.

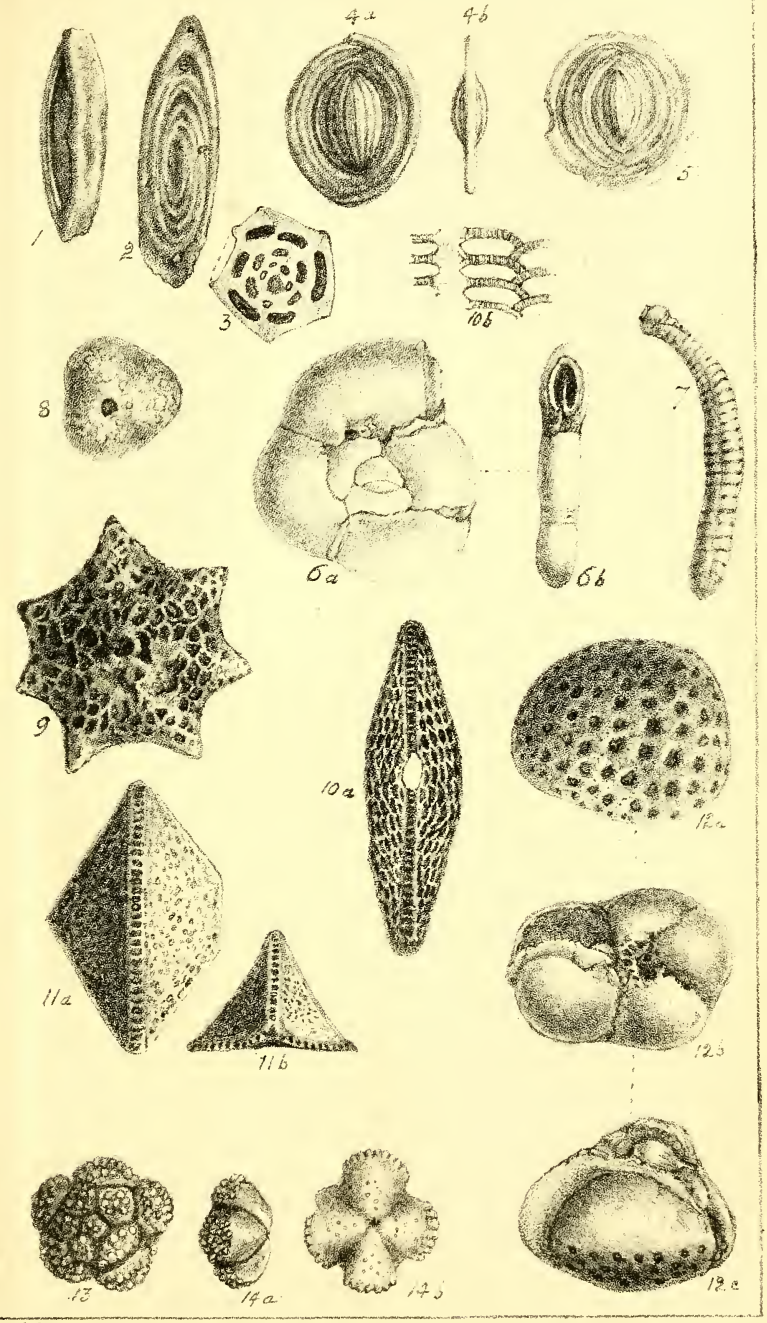
Receipts and Expenditure for the Year ending 30th September, 1889.

Receipts.	£	s.	d.	Expenditure.	£	s.	d.
To Balance in hand 30th September, 1888 ..	6	14	0	By Binding Magazines	0	7	6
" Members' Subscriptions	7	5	0	" Printing and Stationery	0	13	6
" Grant from Royal Society	7	5	0	" Magazines	1	18	3
				" Rail-carriage on Books	0	12	0
				" Postages, &c.	0	17	4
				" Attendant	1	7	0
				" Subscriptions paid Royal Society	7	5	0
				Cash in hand	8	3	5
	£21	4	0		£21	4	0

Examined and found correct.

EDGAR J. BRADLEY, Auditor.

J. W. BUSSELL, Hon. Secretary.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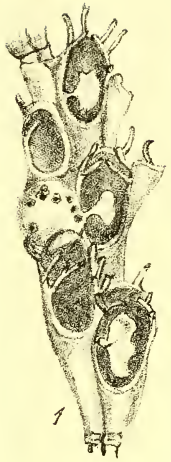
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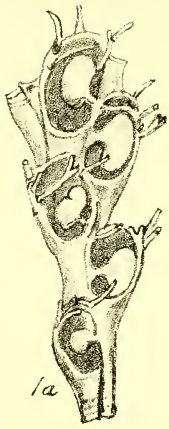
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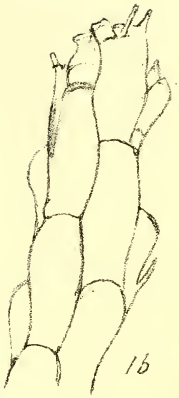
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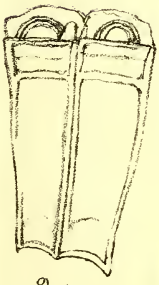
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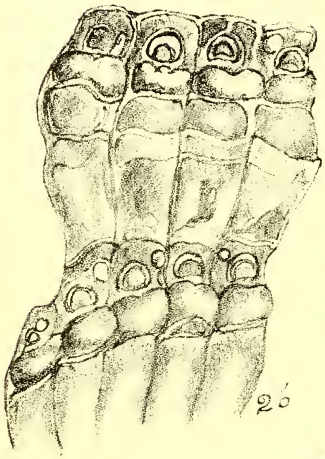
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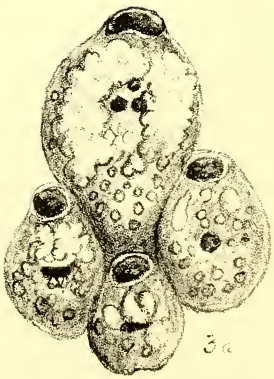
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FIG. 1.

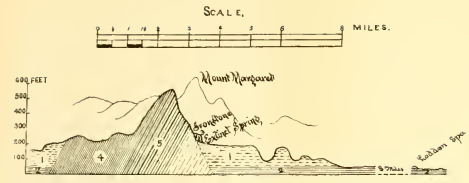


FIG. 2.

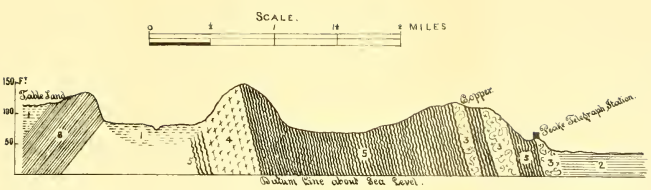


FIG. 3.

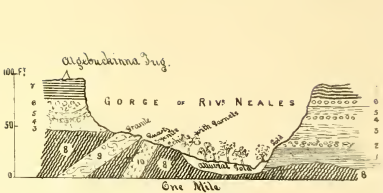


FIG. 4

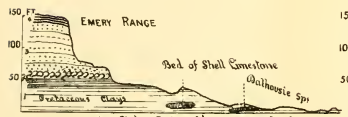
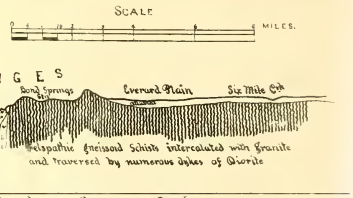
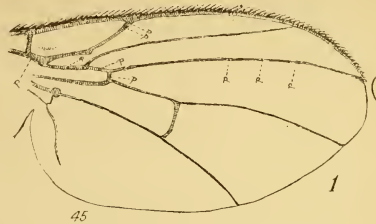
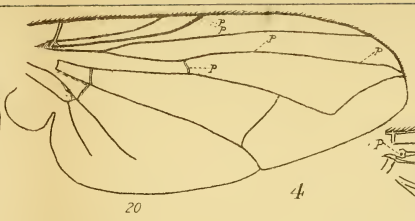


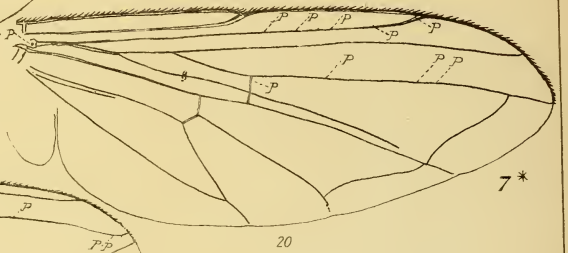
FIG. 5.

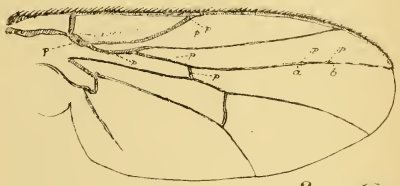
FIG. 6.

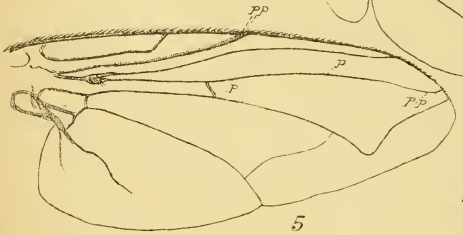


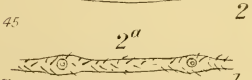


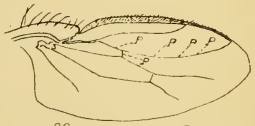


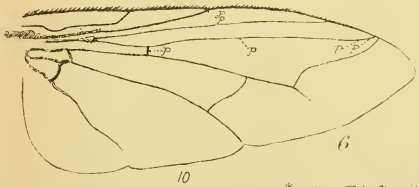










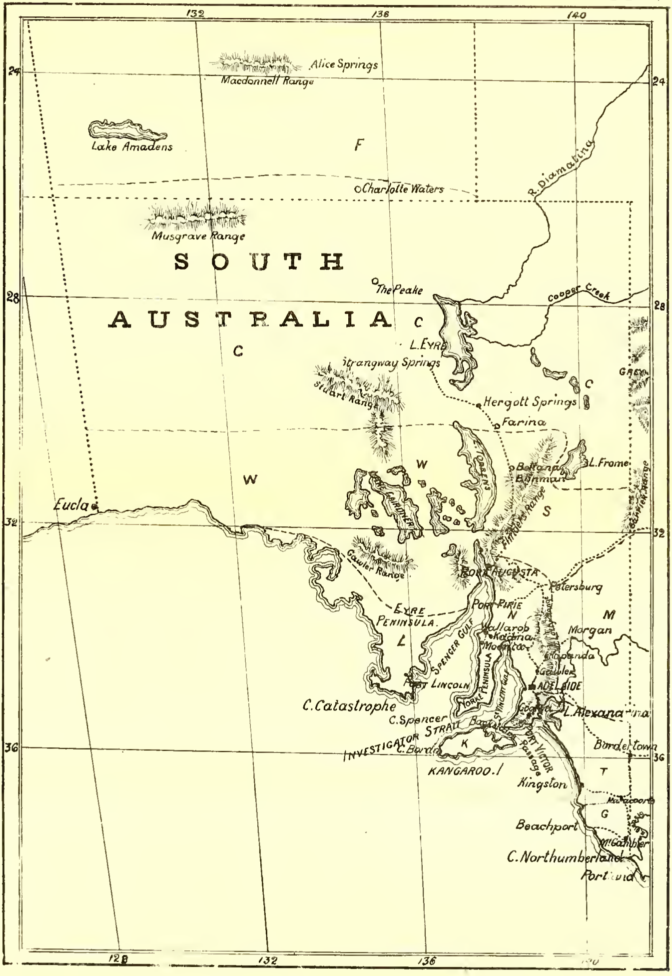


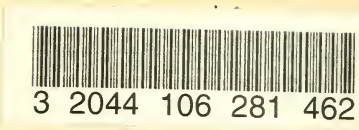
F.S.C. del. ad nat.

* Note. This fly with 10 pores was not examined until after the text was printed. F.S.C.

SURVEYOR GENERAL'S OFFICE, ADELAIDE. Frazer S. Crawford, Photolithographer.

PL. V.


SOUTH AUSTRALIA
Alice Springs
Macdonnell Range
Lake Amadens
Charlotte Waters
R. Diamatina
Musgrave Range
The Peake
Cooper Creek
L. Eyre
Strangway Springs
Stuart Range
Hergott Springs
Farina
L. Torrens
L. Frome
Beltana
Blinman
Flinders Range
L. Gairdner
Eucla
Gawler Range
Port Augusta
Petersburg
Port Pirie
Eyre Peninsula
Spencer Gulf
Wallaroo
Kadina
Morgan
Kapunda
Gawler
Port Lincoln
Yorke Peninsula
Adelaide
C. Catastrophe
C. Spencer
L. Alexandrina
Investigator Strait
C. Borda
Kangaroo I.
Port Victor
Passage
Bordertown
Kingston
Beachport
Mt. Gambier
C. Northumberland
Portland


3 2044 106 281 462

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